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## Health manpower & the medical auxiliary



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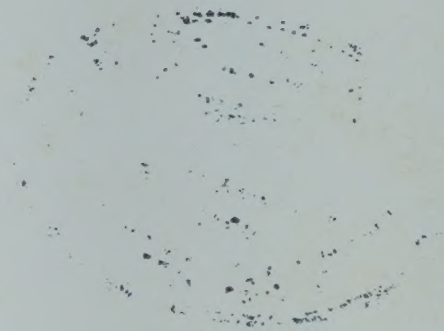
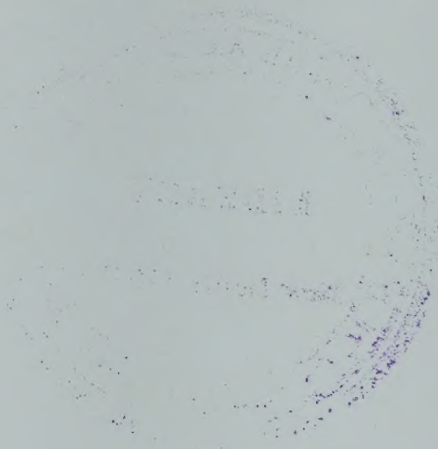
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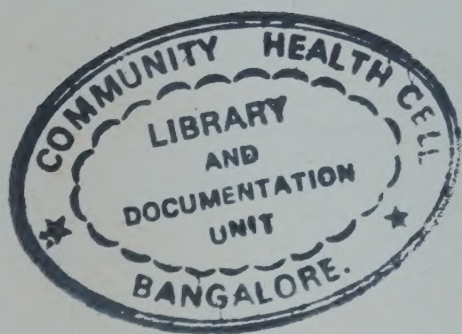
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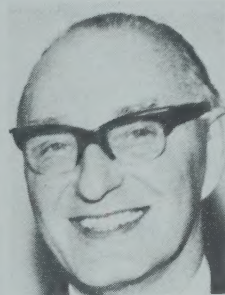
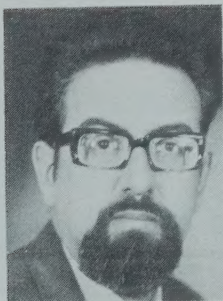


# HEALTH MANPOWER & THE MEDICAL AUXILIARY

Some notes and an annotated bibliography  
General Editor OSCAR GISH



INTERMEDIATE  
TECHNOLOGY DEVELOPMENT GROUP  
LONDON 1971



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# Foreword

What is the use of medicine if the sick are denied it? Tragically, they often are. The means exist, but many of those who most need help never get it. Although we can now prevent much untimely death, unnecessary deformity and undeserved misery, we do not.

First we have to be radical in deciding how much of each kind of skill is wanted. Then we must be determined in training sufficient teams of people with these skills. We devote too much attention to the leader of the team, to the costly, prestigious and intensely skilled doctor, with his long training, his readiness to move away from the communities that need him most in search of those that can reward him best, and his frequently greater concern for the technical sophistry of medicine than for the human need around him. At the same time we demarcate too sharply the role of the registered nurse, whose training is becoming so academic and theoretical that it is denying her the opportunity to assist the doctor in many of the time-consuming tasks that take up so much of his day.

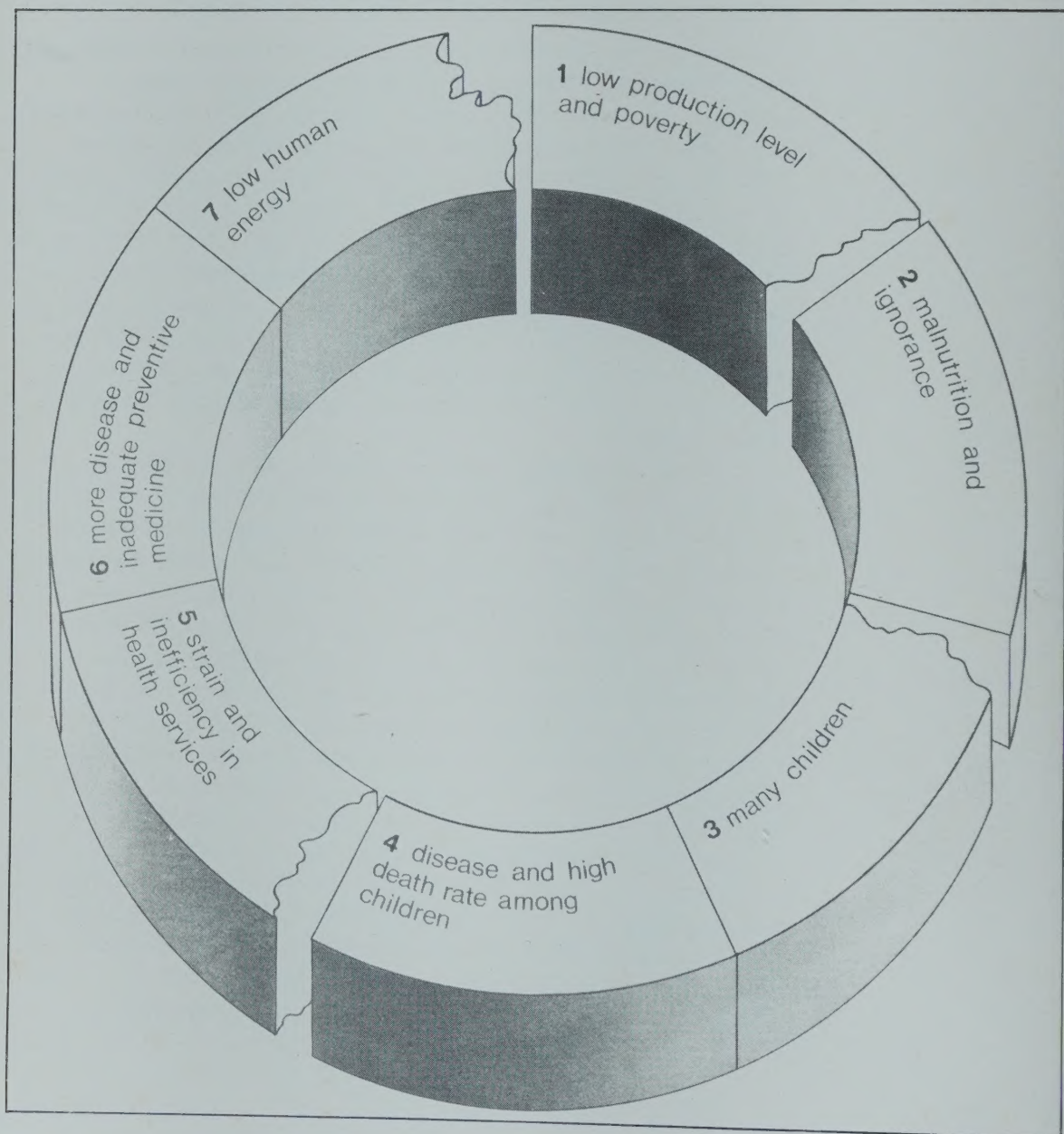
It is this gap in the spectrum of human necessity and the services needed to fill it that the auxiliary, and especially the medical assistant, can close so admirably. Suitably trained, the auxiliary can prevent, diagnose and treat many of the common conditions, and refer those beyond his competence for more expert opinion. He is within the means of the poor, whereas doctors in any number are not, and he is less likely to move away from those who need him. It is thus not surprising that there should be increasing interest in the medical assistant in many parts of the world, a concern that where he exists he should be better trained in greater numbers, and a determination that where he does not exist he must be introduced. From the point of view of the underprivileged sick of the world, in both the poorest and the wealthiest countries, this is probably the greatest single medical challenge of our time. We have the knowledge, and the auxiliary, particularly the medical assistant, is a large part of its solution.

Maurice King  
*Lusaka*  
*March 1971*

## THE CYCLE OF MISERY

NUMBERS 1 to 7 ARE THE STAGES IN THE CYCLE, WHICH LEAD TO EACH OTHER IN BOTH DIRECTIONS

The following can help to break the cycle: appropriate agricultural and industrial technology (between 7 and 1 and between 1 and 2); education in health care and nutrition (between 1 and 2 and between 3 and 4, 6 and 7); family planning (between 2 and 3); and appropriate health care technology (between 4 and 5 and between 5 and 6, 6 and 7). To achieve any real success the cycle must be broken at the same time in at least two places: *e.g.* family planning is useless without appropriate technologies.



# Introduction

Poverty, it has often been noted, is part of a vicious cycle: it causes numerous disabilities, such as malnutrition, ill-health and disease, which in turn are among the most important causes of poverty.

The Intermediate Technology Development Group is a voluntary organisation dedicated to the fight against world poverty by means of policies and measures designed to help people to help themselves. It is not possible to be engaged in this work for long without realising the crucial importance of health services, particularly in the rural areas of the developing countries where most of the world's poor are actually living.

Alongside its other activities, the group has therefore been concerned to study the problem of rural health from the point of view of its primary concern: that is, to identify the methods and technologies that are most appropriate to the conditions actually existing in the developing countries. To be concerned with the maximum promotion of self-help does not mean to underestimate the role to be played by overseas aid and technical assistance. On the contrary, self-help is seen precisely as the only means by which the effect of aid and assistance from abroad can be made healthy and fruitful. In fact, one might go so far as to say that the most important criterion of the value and effectiveness of any kind of aid is the degree to which it helps the recipients to help themselves.

There is no reason to doubt that the advanced countries possess a great deal of valid knowledge, know-how and experience which the poor countries urgently need to acquire and apply. But it is equally certain that not everything the rich countries are doing is suitable for imitation by the poor, and that a high degree of critical selectivity is needed in order to make, as far as possible, the correct choices.

For instance, as Oscar Gish points out, in 1969 the United

Kingdom spent about £40 per head of population to keep its National Health Service operating. Now, £40 per head of population per year is more than the entire national income of a large number of developing countries. It is therefore certain that the National Health Service of the United Kingdom, whatever its merits in its own country, is not a suitable model for copying by the developing countries. Nor can they look to any other advanced country for something more appropriate. The whole matter has to be thought out afresh - and this book is intended as a small contribution to this very necessary process of rethinking. That it is not only the poor countries but also some of the rich ones which are seeking to evolve new methods for their health services is shown with some striking examples in Katherine Elliott's contribution.

The improvement of health care standards in the developing countries sometimes attracts a certain criticism which, while rarely fully articulate, can nonetheless have damaging effects. Hold back with your health services, the critics suggest, until you have established effective birth control. This kind of easy logic is dangerous because it proposes only negative solutions, which can do nothing to break the vicious circle of poverty. Rural (and other) people will not limit their family size in an intelligent way if their lives are stuck in hopelessness, frustration and irrationality; if the survival chances of their children are slender; and if there is no reasonable expectation that those who do survive can work their way out of economic misery. There is, in fact, reason to believe that as health services improve, birth rates decline. As Dr Elliott has pointed out, 'Women will *demand* birth control once they are assured existing offspring will survive, and this requires basic health services, especially preventive medicine and also improved subsistence agriculture.'

This publication arises out of the discussions of the group's panel on rural health. Three of its members, including its chairman, Kenneth Hill, felt that a guide of this kind would fill a gap in the literature available to those who plan and administer health programmes in developing countries. The results fully justify their belief. The group is greatly indebted to the authors; to Miss Pamela Logie, the group's research officer who assisted with the annotations; and to the Claremont Trust whose generous support made publication possible.

E F Schumacher  
9 King Street  
April 1971

# Towards an appropriate health care technology

*OSCAR GISH*

It has taken many years for today's industrialised countries to advance to their present state. Not surprisingly, the countries of Africa, Asia and Latin America also aspire to create technologically advanced societies. Clearly, this task ought more easily to be accomplished now than in any earlier period, the major reason being the existence of the sophisticated technologies which are flowing from the advances in science to be seen in Europe and North America. It would seem to be a relatively simple matter for countries in the 'third world' to utilise already existing techniques, many of them highly productive, for purposes of development.

Unfortunately the mere existence of advanced techniques does not assure the possibility of their application to the problems of developing countries. The technologies which are being developed and utilised in the advanced countries are, as would be expected, suitable for the resource base of those countries. Many of them require a relatively abundant supply of capital, and a scarcity of labour is generally assumed. By contrast, virtually all developing countries are suffering from severe shortages of capital and a vast oversupply of available labour - particularly of the unskilled variety. What is required in countries of the latter kind is a technology designed to take advantage of their large supplies of labour and to minimise the need to draw upon their scarce pool of available capital.

Just as the new technologies of Europe or North America are likely to have only limited applicability to the problems of the Sudan or Malaysia, so too with many of the exciting new discoveries in the various areas of pure scientific research now being carried out in the industrialised countries. Because 98percent of all research and development activity is being carried out in the developed countries and only two percent in the developing countries (excluding the Socialist countries from the calculation), the developed countries must inevitably determine the 'frontiers of science' on which scientific workers will prefer to be engaged.

And, just as inevitably, the frontier problems which will be of interest to scientific workers in developed countries will be those that stem from the socio-economic conditions of those countries. As such, they will be of only limited usefulness in those parts of the world with very different socio-economic conditions.

All of this is not to argue that new scientific and technological advances have no relevance to the situation of developing countries, at least in the long run: however, it is fair to say that their usefulness - particularly in the short run - is likely to be limited. One important proviso to the above is the possibility of creating new technologies (or reviving old ones) which are specifically geared to the resources and capabilities of the less developed countries. Most important in this respect is the need to adapt existing knowledge in the interests of development.

One important technological area in which sufficient knowledge either already exists or need only be adapted for specific conditions is that of medical care. The conditions of morbidity and mortality in developing countries are such that no new medical discoveries are necessary in order to reduce the incidence of disease and death to orders of magnitude which may be only a quarter (eg, infant mortality) or even a tenth (eg, childhood mortality) of their present levels.

There exists increasing agreement among those connected with the 'creation' and 'delivery' of health care that future improvements in these areas will be achieved primarily through innovations in health delivery systems in both developed and developing countries. Although many of these necessary innovations could only be accomplished in conjunction with very far-reaching social, economic and political change, very many others could be accomplished even in the absence of sweeping reforms. There would be need for changes and adjustments, in any event, but none need be totally unacceptable to existing political, social, economic, professional or bureaucratic interests. Any proposals designed to reorientate as complex a system as that employed for the delivery of health care must inevitably meet with numerous resistances, but there is no reason to assume that these obstacles cannot be overcome.

The concept of an appropriate technology for health care recognises that all countries are subject to limitations in their ability to provide care. No country in the world makes available, or can make available, all of the existing, most advanced medical techniques to all of its citizens. Even in those countries in which access to care is most equitable, such as the Soviet Union and the United Kingdom, there are still differences in the treatment available to, say, those who live in London or in Moscow and those in the far reaches of Scotland or Siberia. The answers to the problems of developing improved health care systems are not to

be found, either, simply in the expenditure of larger and larger sums for health purposes. The example of the United States, with its vast expenditure on health care and relatively poor morbidity and mortality statistics, is evidence of this.

The realisation that unlimited health care cannot be achieved even in highly industrialised countries has given support to the concept of an appropriate, intermediate health care technology. This concept is even more suitable in countries which may be spending as little as a hundredth part of the amount being spent in Britain for the health care of each inhabitant.

Appropriate technologies are intermediate in nature; that is, they will fall somewhere in the midst of those which use most capital, those which use most skilled manpower, those which are most difficult to maintain and those which are completely traditional in character. This very wide range of possibilities must be narrowed down in keeping with the requirements of individual countries at specific times. Clearly, what is a suitable intermediate technology for Britain will not be so for Nigeria.

Intermediate health care technologies in developing countries will take advantage of the supply of labour available and conserve capital. One particularly important by-product of such an approach will be to help decrease the catastrophic political, social and economic effects which very high levels of unemployment are having on developing countries. The several chapters which follow, and more especially the materials listed in the bibliography, will spell out many of the other advantages of an intermediate health care technology.

## *HEALTH PLANNING IN DEVELOPING COUNTRIES*

There are three basic reasons why planning for health care must be radically different in rich and in poor countries.

First, there are the different levels of resources — money as well as skilled manpower — available to rich and poor countries.

In 1969 the United Kingdom spent about £40 per head of population to keep its National Health Service operating. The United States spent almost £125 per head for health services in that same year. By contrast, Ethiopia spent around 20p for the health care of each

of its 22 million people. The expenditure for health in Britain represented about five percent of the country's Gross National Product. Ethiopia's expenditure represented perhaps 0.6 percent of its GNP. Even if the Ethiopian expenditure for health care were to be multiplied to a figure equivalent to Britain's, the total outlay would then only be around £1.25 per head.

Differences in the availability of financial resources are also reflected in the statistics for hospital beds in rich and poor countries. While there are 10 beds for every 1000 of the population in the United Kingdom, there are fewer than two per 1000 in Mexico and only 0.4 per 1000 in India.

The disparity in the number of available medical workers is no less great. In the United Kingdom there is one doctor for every 860 people, but there is one for each 5000 in India, one for each 13,000 in Haiti, and only one for every 30,000 in Nigeria. Also to be taken into account is the fact that doctors are much more evenly spread, relative to population, in a country like Britain than they are in such countries as India, Haiti or Nigeria.

A second basic reason for the need for different types of health planning in rich and poor countries is the differing structure and location of their populations. In a developing country a third of the population will be under 10 years of age — two or even three times the percentage to be found in most industrialised countries. Another basic factor will be their rates of increase. In most wealthier countries, population is increasing at between 0.5 percent and two percent per annum. In developing countries the increase is more likely to be nearer 2.5 percent or even three percent.

Distribution of population is also very different in developed and developing countries. Rural areas are likely to hold 50 percent to 90 percent of the population of developing countries, but in the United Kingdom only 5 percent and in the United States only 10 percent of the population is classified as rural. In addition, the rapid rate of urbanisation in poor countries presents special problems. With urban areas increasing at around six to eight percent a year the growth of shanty towns (*bidonvilles*, *favellas*, *callampas*, etc) is of particular importance.

The third basic reason for approaching health planning differently in rich and poor countries is the drastic difference between existing disease patterns in the two types of nation. In the developing countries there are so many children, and their disease patterns are so inadequately cared for, that half or more of all deaths occur among children under five. In the United States, by contrast, over half of all deaths are caused by diseases of the heart and blood vessels, primarily among people between 50 and 70 years old.

In developing countries infant mortality (0 - 1 year) may be four or more times as high as in industrialised countries, while childhood mortality (1 - 4 years) may be more than 40 times as high. Children in poor countries typically die from diarrhoea, pneumonia and malnutrition. The diseases of the developing countries are largely those of poverty.

## Resources: facilities

How then should a country with perhaps 50p a head to spend on the health care of its population (a not untypical figure) utilise its limited financial resources?

In rich countries the focus of health care has been shifting gradually away from the family doctor/general practitioner to the hospital and hospital-based specialist. This process has not been an easy one and its desirability has been called into question. Desirable or not, it must be recognised that the massive shift to hospital-based medical care is of fairly recent origin, and coincides with other aspects of change associated with economic development.

In most low-income countries the same sort of hospital-based medical care systems are being established, or at least attempts are being made to establish them. However, in the absence of substantial economic development, such hospital-based systems are making impossible the spread of essential health services to the mass of the population. It is not unusual for the capital costs of a large city or regional teaching hospital in Africa to be greater than the entire annual health budget of the country. The cost per bed in such circumstances may very well run upwards of £5000, and that in countries with incomes as low as £30 per head of population.

In principle, teaching hospitals in the capital city function not only as the teaching base for the medical school (as well as being a centre of research) but also as the peak of a medical care referral system. That is, patients from all parts of the country are sent upwards along a health care chain which starts with aid stations or dispensaries or health centres, then moves up through rural and district hospitals, and finally ends with the capital city teaching hospital. Hospital-based medical care and the hospital referral system are, however, likely to work only to a very limited extent. For instance, in Ghana it is estimated that fully two-thirds of the population are not effectively covered by government curative health services, which are primarily available only at hospitals. The inadequacy of the hospital-based referral system may be illustrated by data drawn from New Mulago Hospital in the Uganda capital of Kampala<sup>1</sup> In 1964, of all admissions to Mulago, 93 percent came from the Mengo District in which Kampala is

1 Hamilton, P J S, and Anderson, A: *An Analysis of Basic Data on Admissions in 1963 and 1964 to Mulago Hospital, Kampala*. Mimeo

located; even if we exclude obstetrics and gynaecological admissions, 98 percent of which were from Mengo, the figure only comes down to 88 percent. Clearly then Mulago Hospital, at least in its curative work, is primarily serving as a district hospital. The same is true of most others of its kind. They are not truly national health centres.

Rural and district hospitals need not be as expensive as teaching hospitals. A bed in a teaching hospital in Africa will cost about £5000, and a bed in a district hospital perhaps £2000. A rural hospital bed will generally cost half to three-quarters of that figure, and sometimes even less than half.

The costs of equipping and running hospitals are related to their capital costs. But the larger, more expensive hospital will not only have a higher running cost owing to its size; the cost will also be *proportionately* higher than for the small institution. One major reason for this is that a teaching hospital will have more specialists on its staff, more general duty doctors, more registered nurses, and so on, than a district hospital, and a district hospital in turn will have more than a rural hospital. The more capital-intensive a hospital is, the more skill-intensive it is likely to be.

Poor countries (if not rich ones as well) concerned with reaching the whole of their population with a health service must find an alternative to a system which depends upon hospital beds costing from £1000 to £5000 'or more' each. That alternative is a health delivery system which reaches the population at the lowest possible level. The accepted way of reaching a large rural population is through the health centre with its outlying aid stations or dispensaries. The health centre aims to provide the entire health requirements of a family except those which can only be provided in a hospital. A health centre in Africa can be built for somewhere around £20,000 – the cost of four beds in a teaching hospital – and can provide most of the health care requirements for roughly 20,000 people. In a country such as Zambia, 250 health centres, enough for the entire population, could be built at the cost of the new teaching hospital in Lusaka.<sup>2</sup> The recurrent costs of such a health centre are not likely to be more than £10,000 a year, or 50p for each of the 20,000 people covered by the centre. Thus a country with only 50p per capita to spend for health care could still provide basic health care services for its entire population.

Properly staffed, a health centre can supply at little cost much of the medical care required by the people of a developing country. This is because so many of the diseases from which these people suffer are what might well be termed 'health centre diseases': conditions which health centres are particularly well able to prevent or treat. Typical functions might include the

2 King, M H: *A Teaching Hospital for a Developing Country*  
Mimeo

prevention through immunisation of measles (one of the most important killing diseases in many developing countries), tuberculosis, poliomyelitis, smallpox and whooping cough, and, through the health education of mothers, the prevention of the widely prevalent malnutrition in childhood. Most cases of many common diseases can also be readily treated in these centres; among them are leprosy, tuberculosis, pneumonia, gonorrhoea, diarrhoea and dehydration (especially in childhood), malaria and hookworm infection. Health centres can provide family planning services, antenatal care, care of the normal delivery, child welfare facilities, school clinics, advice on environmental sanitation, and curative clinics for a wide range of important diseases. Health centres do not have operating theatres, x-ray plants, or more than minimal laboratory services, nor can they provide a doctor's opinion, so one case in 100 has to be referred to a district hospital; common among such cases are the abnormalities of labour and the consequences of trauma, particularly from accidents on the road. A district hospital in its turn has to refer about one percent of its cases to a regional or national hospital for specialist opinion or special facilities.

This account of health centre services is, of course, oversimplified in that it assumes an evenly (and conveniently) spread population so that each health centre can cover its required number of people. Many countries, however, have very low population densities with people either scattered in small villages or perhaps even nomadic. Such situations are usually best met with systems of aid stations and mobile clinics run from health centres.

Assuming that the generalised health centre service does cover a country fairly well, it is still necessary to provide certain specialised hospital services in addition; these necessary services *do not* include radiotherapy, neurosurgery, cardiac surgery, artificial kidneys and organ transplantation.

The kind of hospital services required in poor countries must be provided in what are usually known as district hospitals, even if such hospitals have to be built in large cities where a number of them can be located in order to provide sufficient scope for teaching and many research purposes. A crude 'guestimate' would indicate that for 50p per head it would be possible to run a network of such hospitals so as to cover an entire population. However, this would mean spending £1 per person (50p for health centres plus 50p for hospital services) for health care instead of the 50p now being spent generally in Africa or Asia. The choice would, then, be either to reduce health centre or hospital coverage, or to raise expenditure on the health services. For a country with a per capita income of, say, £40 to spend, £1 per head or 2.5 percent of Gross National Product would not be unreasonable

Not having these kinds of services does however raise the question of what to do with people who need them, perhaps because they are senior civil servants whose needs become known and identified. In one African country (Zambia) there is a civil servant's extra territorial medical aid society whose members insure themselves for the provision of these services abroad

for health expenditure. (Developed countries spend twice that figure, and underdeveloped countries are spending considerably more on, for example, education.)

## Resources: manpower

The kind of facilities employed for delivering health care are critical in determining the type of manpower employed. Large capital city hospitals, of the type discussed earlier, require specialists and other highly qualified manpower if they are to do their proper jobs, namely specialised medical research, teaching of highly qualified manpower, and the care of patients suffering from the 0.1 percent of health problems which cannot be handled adequately in smaller, simpler institutions. In many developing countries there are not sufficient staff to man the existing large hospital facilities. Ethiopia, for example, has built a large new hospital for teaching purposes without any immediate prospects of staffing it. In this connection it is worth noting that in Africa the number of doctors per head of population actually declined between 1962 and 1965, as a study of two groups of 13 Franco-phone and 13 Anglophone countries has shown.<sup>3</sup> In 1965, among these countries, there were three with one native born doctor for less than 20,000 inhabitants, nine with one to 20,000 – 50,000, 11 with one to 100,000 and more, and two countries with not one indigenous doctor at all.

These figures, however, do not show the real situation because of the concentration of medical personnel in the capital cities. In 11 African Francophone countries in 1965 about 60 percent of the indigenous and 50 percent of the expatriate doctors were located in the capital cities.

Health centres, in contrast to hospitals, can be operated by a variety of men and women with middle level skills even in the virtual absence of anyone with a university education. The variety and scope of auxiliaries, as well as para-medical staff, has been outlined elsewhere.<sup>4</sup> Here it will suffice to say that, in general, the various types of auxiliaries make up a skill continuum which extends from those with very little education and training (say six years of schooling and virtually no training) to those with complete secondary education plus a number of years of training.

Paramedical staff should not be confused with auxiliaries; they include registered nurses, pharmacists, laboratory technicians, health inspectors and other such staff who are fully qualified professionals. They usually do not, however, have the university education required of doctors although their international status is usually recognized.

The medical assistant is the key auxiliary. He is the major provider of primary medical care in many African and Asian

3 Vysohlid, J (1968): *Health Manpower in the African Region*. Economic Commission for Africa Working Party on Manpower and Training, Addis Ababa. United Nations Economic and Social Council mimeo E/CN.14/WP.6/19

4 See for example King, M H (1966): *Medical Care in Developing Countries*, Chapter 7 (Bib No 11)

countries. For example, in Kordofan Province in the Sudan there were 2.1 million inhabitants in 1969. This population was served by 36 doctors located in 12 hospitals; there were also 81 medical assistants in 81 dispensaries, and 126 qualified nurses in 126 dressing stations. It is these medical assistants and qualified nurses who were providing the bulk of the health care for the people of Kordofan Province.

At present the Sudanese medical school in Khartoum is producing 30 graduates per year. It is proposed to raise that number to 160 by 1975. Is it then reasonable to expect that, given time, doctors will gradually replace medical assistants in the Sudan?

The education received by medical students in the Sudan is virtually indistinguishable from that of medical students in, say, Britain. That is, medical education which is very much in tune with hospital-based practice and entirely consonant with employment in a large city. At present over a third of all Sudanese doctors work in the capital city, where about five percent of the population live. In future the increased output from the medical schools is likely to find itself concentrated in the capital city to an even greater extent than is the case at present. This phenomenon can be seen clearly in other countries in the Middle East and Asia (eg, India, Pakistan, Iran) which have been increasing rapidly their output from medical schools but can still show no very significant increase of doctors outside the capital cities and other large towns.

In time, as the larger cities become saturated with medical men, some will have to remove to the smaller centres. But perhaps an even greater number will escape from the burden of excessive competition in the cities by emigrating to another country altogether.

In the United States there are already 25,000 medical graduates from schools in developing countries, and in Great Britain there are close to 10,000 doctors who were born in Asia and Africa — primarily in the Indian sub-continent. Canada, Australia, Germany and France have also become the beneficiaries of medical personnel born (and usually trained) in the third world.<sup>5</sup>

The medical 'brain drain' from the developing countries is an extension of the general problem of providing medical education and health manpower planning which is suitable for the conditions of poor countries. If doctors are trained in postgraduate specialities, of which poor countries can support relatively few practitioners, then it is inevitable that numbers of them will emigrate. The crux of the problem is whether to train doctors for the needs of the mass of the population who are rural dwellers, with low effective economic demand, or for those relatively few urban dwellers who have a high effective economic demand. If

5 The discussion about medical 'brain drain' which follows is drawn from Gish, O: Medical Education and the Brain *Brain Br J Med Educ* Vol 3, No 1, pp11-14

the increasing numbers of medical graduates in developing countries are all to enter into urban competition with each other then some of them must necessarily emigrate; they cannot all practise successfully among the relatively small urban middle and upper classes.

It is clear that careful attention must be paid to the likely effects of a particular kind of medical education and further specialisation. If international emigration of doctors is 'only' an extension of the rural-urban migration problem, the type of medical education that will forestall international emigration is also likely to increase the number of doctors working in the countryside.

Medical education has to be geared to the type of health problem experienced by a given country's entire population. If 80 percent of the population is rural, then 80 percent of the medical students should be educated accordingly. Because the causes and prevention of illness, disease, and death vary in rural and urban areas, the 80 percent or so of doctors who should be preparing for work in rural areas must come to know the causes that are connected with rural life, and the consequent methods of prevention of illness, disease, and death in those areas. Successful medical education, intended to produce doctors for rural areas, should be orientated towards work in those areas, and new curricula must be designed for such purposes.

Two corollaries which follow from the above discussion are: first, the desirability of producing a doctor with the *minimum* and therefore the least expensive training necessary to fulfil his duties; and second, the need for at least part of that man's medical training to be carried out in a district or rural hospital in the countryside.

The solution to the problem of how to retain doctors in their own countries, and in rural areas, is to be found in their training. Those who are chosen to study medicine must be committed to the health requirements of the mass of their country's population. Their education must then reflect their commitment. It is too late *after* medical education has been completed substantially to change the pattern of a doctor's life. That pattern has already been set by the nature of the training he has received. If medical training has prepared a doctor only for medicine as practised in a modern teaching hospital, he must then either practise in his country's capital city or go abroad.

Tax and housing incentives might be among the means for drawing doctors to the countryside. Still more desirable are active health centres and good and interesting professional conditions in the rural areas. Travel, promotion and honours should go to rural medical workers in recognition of their important work. Needless to say, the national health budget should be allocated fundamentally

in keeping with the nation's population distribution.

It is, however, suitable medical education that can lay the foundation for keeping doctors usefully employed in their home countries. Part of the process of suitable medical education is a selection process. The likelihood of a given medical student remaining at home upon completion of his studies is one key element in a properly organised medical selection process.

In a developing country one of the doctor's main roles is to act as teacher, supervisor and consultant to a team of auxiliaries. He is most often required to fill this role by supervising a series of health centres in the rural areas or by running a district hospital, and this not only for a year or two after qualification, but for the majority of his professional life. There is an increasing realisation that the best way of achieving this state of affairs is not to train him in a lavish, thousand-bedded, chromium-plated, multimillion-pound teaching hospital which accustoms him to facilities that cannot be reproduced elsewhere in the country, and which therefore dissuades him from working subsequently in a district hospital. Rather it is to train doctors under conditions which are much closer to those in which they will later have to work, particularly in district and rural hospitals. This is indeed the policy of the new medical school in Zaria, Northern Nigeria, which is breaking away from the traditions set by earlier medical schools in Africa with their inappropriate if otherwise excellent patterns of training.

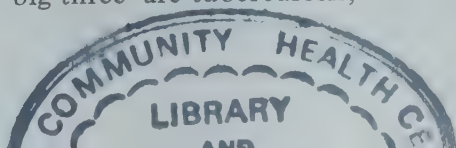
What is required then is a sufficiency of suitably trained doctors equipped to lead teams of medical auxiliaries. These teams should be part of a health centre service (under a Director of Health Centre Services) which acts as the basic carrier of health services in the country. Such a health centre service should be the base upon which all other health care in the country rests. The focus of medical attention must be shifted from the big teaching hospital on the capital city hilltop to the unobtrusive health centre in the village.

## Population: structure, location and growth

The populations of developing countries are young, fast-growing and still primarily rural in spite of rapidly increasing urbanisation. All of these demographic imperatives give rise to special health care considerations.

The diseases of children in developing countries are particularly amenable to prevention in contrast to cure. The major killing diseases of children in poor countries are the group of childhood diarrhoeas, pneumonia and protein-calorie malnutrition (PCM). Following behind this 'big three' are tuberculosis, intestinal

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helminth infections (worms), measles, whooping cough, malaria, and accidents.

The nature of these diseases, coupled with the age structure and rural domicile of the population, supports the view that the health centre and the medical assistant are the basic instruments upon which the health services must rest. Not only can health centres fit more closely into the rural health as well as the general rural environment, they can also offer an appropriate base for family planning work within the context of maternal and child care activities.

Maternal and child health care can be best, if not only, carried out close to or within the home environment of the woman and her child — that is, mainly within the village. An exhibition of slides showing the dangerous diseases borne by mosquitos or snails which is seen in a two-room mud dwelling belonging to 'one of us' takes on a significance which cannot be achieved in the context of a large impersonal hospital building which belongs inevitably to 'them'.

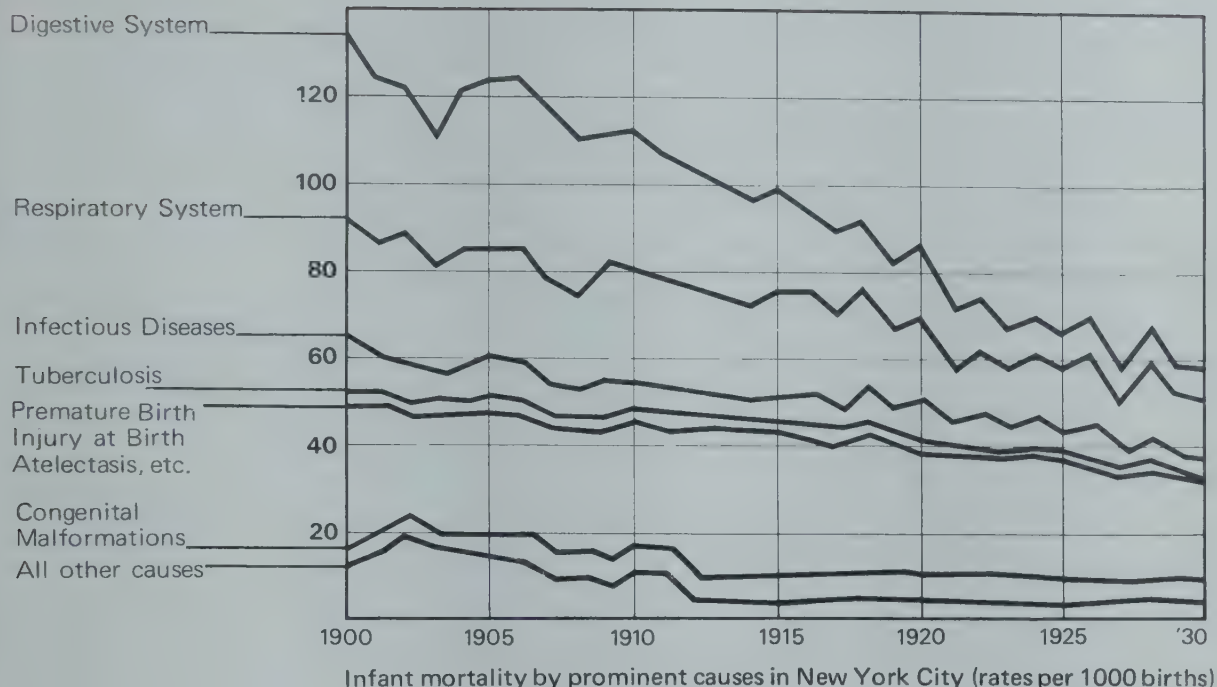
The special problems connected with rapid urbanisation must also be kept in mind. The crowding together of large numbers of people into small, insanitary areas has placed intolerable strain on health and social services in the towns and cities of developing countries. Probably no other measures could do more to improve the situation in these urban slums than the provision of fresh water in adequate quantities and the installation of proper sewage disposal systems together with a general improvement in sanitary and hygienic conditions. Beyond these, there are all the social services necessary to deal with conditions which are making for increasing venereal disease, mental illness, and other social illnesses in the growing slum areas which threaten to engulf many towns and cities in Africa, Asia and Latin America and more than a few in Europe and North America as well.

## Disease patterns and the road ahead

It has already been indicated that the types of diseases to be found in tropical countries are in the first instance to be treated as aspects of poverty rather than of the tropics. This point can be nicely illustrated by data drawn from the medical history of New York City.<sup>6</sup>

Throughout the 19th Century the death rate in New York remained constant at about 30 per 1000. A substantial part of that death rate was due to a level of infant mortality which was not unlike that which is to be found in developing countries today. As shown in the graph, the first three decades of this century saw a dramatic decline in infant mortality in New York City from 140 per 1000 to less than 60 per 1000. Of that fall,

6 The discussion which follows is based on material presented by W McDermott in *Man-power for the World's Health*, a report of the Institute of International Health Education (1966), ed Zile Hyde, H van (see Bib No 63)



two-thirds occurred in the diarrhoea – pneumonia complex of childhood diseases.

This striking decrease was accomplished by a series of measures taken early this century. Some of the specific public health developments of the period included an improved water supply, better control over and distribution of foodstuffs, and the inauguration of visiting nurse services and well-baby clinics. This period also saw the growth of paediatrics and, perhaps particularly important, major campaigns against illiteracy and a substantial increase in primary schooling.

It is not possible to argue that a specific set of measures taken in the particular circumstances of New York City at the turn of the century are necessarily relevant to all, or indeed any, of the countries in Africa, Asia or Latin America today. What is clear is that the road leading to the reduction of morbidity and mortality is not necessarily paved with advances in medical science. In fact, the technological possibilities inherent in already existing knowledge about the causes, prevention and cure of disease are far greater than our social and political (not to mention economic) ability to utilise those possibilities fully.

The same road is more likely to be paved with social and political advances, reflected in an improved system for the distribution of health services, rather than with further scientific advances as such. This last is probably not only true for poor, but for rich countries as well.

# Intermediate technology in medicine

*KENNETH R HILL*

In Northern Nigeria there is one doctor to 150,000 people, and the problem of how to deliver medical care both in quantity and in quality to such a populace requires urgent solution. The conditions found in Northern Nigeria are similar to those in many of the developing countries.

In 1965 the World Health Organisation laid down a minimum target for the next decade of one doctor for each 10,000 of the population. Throughout Africa (excluding Egypt and South Africa) the average doctor/patient ratio was then one to 20,000. To meet the WHO target an increase in the number of doctors in Africa from 10,000 to 24,000 was needed immediately. This was roughly equivalent to the complete 10-year output from all the medical schools in Britain. Northern Nigeria alone would have required 17 times as many doctors to look after its 30 million people as it then had: 3000 instead of 175! In 1965 no local medical school existed, and the first 30 doctors from the new medical school in Zaria will qualify only in 1973. At this rate it would need 100 years to provide 3000 locally trained doctors to look after the people of Northern Nigeria, and the population there is expected to double by the year 2000 . . .

Recruits for physician training must already have received a high level of secondary school education. Most developing countries are handicapped by gross deficiencies in the primary and secondary school infrastructure. In East Africa, out of 1000 children attending primary school only 10 go on to secondary school, and only one continues training after leaving secondary school. Educational priorities in developing countries may have to be slanted towards increasing the supply of primary and secondary schools rather than establishing more centres for higher education in the form of universities. But physicians can only be trained at university level. The medical school has to compete with other equally important disciplines such as agriculture, engineering and education among students eligible for university places.

To this handicap is added the phenomenal cost of producing a doctor. It is estimated that the cost of training a physician is

1 Bryant, J H (1969):  
*Health and the Developing World* (see Bib  
No 4)

£15,000 in the UK and £22,000 in the USA. In his recent book *Health and the Developing World*<sup>1</sup>, Bryant estimates that in medical schools in the developing world it costs at the moment up to 65 percent *more* to train a student than the £22,000 this costs in the USA. The new African medical schools such as Lusaka, Zaria and Addis Ababa hope to bring their cost per student down to below even the British level, but they all have yet to graduate their first new physicians. In any event, teaching hospitals are very expensive, and Mr Gish shows elsewhere in this publication how maintaining a university teaching hospital can 'milk' the slender resources available for health care in a developing country to the detriment of other services, especially rural health.

Even if the countries concerned could afford the high cost of training large numbers of physicians, too little thought has so far been given to what type of doctor should be trained. In the West, the modern medical school curriculum demands a high level of education in the basic sciences, is highly specialised, and uses sophisticated equipment and techniques; it is almost entirely hospital orientated. There is little emphasis on community and preventive medicine, on public health and health education. This type of training does not prepare the student for the pastoral and general duties required in developing countries. The majority of the sick do not need the complex hospital facilities which are part of modern medical thinking and education; but the doctor has not been trained in selection and he tends to want to practise in the shadow of the hospitals which are in urban areas. The diseases of the masses, which are in the rural areas where perhaps 75 percent of the people live, are ignored, whereas the out-patient and in-patient departments of the district general hospitals in the towns are swollen to gigantic size, cramming the hospitals with people in numbered anonymity. In India today, for example, roughly 80 percent of the population live in the rural areas, whereas approximately 80 percent of the doctors are to be found in the towns and cities.

The test of any educational programme lies in what the person actually is able to do, not what he has been taught. Dr Rosa, after considerable experience in Ethiopia, has suggested some guidelines for the training of a doctor who is to work in a developing country<sup>2</sup>. He writes that where there is only one doctor for as many as 150,000 patients, Western methods of training, even if intended for general practice, are inapplicable. The doctor cannot himself cope with each individual case but must be trained as a leader in health programmes. This training should be designed within the context of local problems and should include the following:

2 Rosa, F (1964):  
*A Doctor for Newly Developing Countries: Principles for Adapting Medical Education and Services to Meet Problems* (see Bib No 92)

- 1 Orientation towards the practice of preventive medicine and public health at community level. This means the development of health services within limits which the people can support locally
- 2 Training in the instruction and leadership of auxiliary workers. These may be people such as nurses, laboratory technicians and sanitarians who are literate and will already have received some kind of formal training. Alternatively, the auxiliary worker may be indigenous and illiterate. The latter, however, given a brief training and modern tools, can often achieve a greater reduction in sickness than the best doctor managed to achieve 25 years ago
- 3 Instruction in handling mass campaigns against, for example, smallpox, tuberculosis, syphilis, trachoma and malaria, together with a widespread health education programme
- 4 The development of community self-help programmes: *eg*, better water supplies, improved drainage
- 5 Knowledge of maternity and child health needs. In any developing country, a large proportion of the population will be children, and improvement in nutritional standards, widespread immunisation against communicable diseases and instruction in methods of family planning are vital
- 6 A sympathetic appreciation of local culture and resources. Effective medication should be, as far as possible, cheap, simple, practicable and suitable for use in field or clinic rather than in a hospital.

Dr Rosa's proposals make use of intermediate technology in the form of intermediary medical personnel such as nurses, medical auxiliaries, sanitary workers, who work as a team led by the physician. Dr Rosa's practical suggestions make good use of the delivery of medicine to large numbers of people and also emphasise the prevention of disease, a subject which receives too little attention. Nigeria spends six times as much on curative medicine as it does on preventive; yet it has been estimated that even a doubling of the expenditure on preventive medicine would transform the whole medical picture there.

Dr Rosa suggests using intermediary personnel in the delivery of health care, and to some degree his suggestions are already being accepted in the West. The identity and status of intermediary personnel must therefore be clarified so that they can be accepted as an essential part of the world health scene. It cannot but be admitted that objections are raised by the established

corpus of doctors to the use of auxiliaries in medicine. The medical profession jealously guards its right to diagnose and to prescribe, yet in actual practice doctors are often forced to delegate this responsibility.

In the past, an auxiliary (or in this particular case a second tier doctor) was extensively used in India, where he was called the Licensed Medical Practitioner or Surgeon's Assistant: in other territories another intermediary grade was known as the Medical Assistant. These systems worked well, for in practice it was found that the environment conditioned the job rather than any particular scheme for medical education or any government's particular health policy.

As many newly emerging countries achieved independence, this well tried form of medical practice was often discarded; but now even the more sophisticated countries are being forced to adopt a policy of delegation of responsibilities. This can be seen in both the USA and the UK. In the USA, owing to the lure of specialisation in medicine, there is a dearth of general practitioners, of doctors of primary contact, and intermediary medical personnel being trained include the Physician's Assistant at Duke University in North Carolina, the Nurse Practitioner at Denver in Colorado, and the Medexes in Seattle, Washington and various other places. Altogether 28 such training schemes have received support from universities, state medical associations and Government, and these practice assistants give primary medical care to thousands of people. In Britain, for similar reasons, general practitioners are in short supply and health centres are being developed in association with the delegation of responsibilities to a host of intermediary personnel such as midwives, district nurses, health visitors and social workers. In the USSR the *feldsher* has been established for many years, especially in rural areas. The *feldsher* resembles a nurse but with extra training in diagnosis and treatment, and there are almost 400,000 (most of them women) in practice in the Union. Intermediate medical personnel like those already described, differing perhaps in skills, but still part of the national medical team, have been used for years past in Sweden, in Spain (the *practicante*), and in France, where the druggist in a French pharmacy dispenses a considerable amount of advice and treatment and could well be compared with the English apothecary of an earlier age, who became the general practitioner. In New Zealand there is a newly established training school where medical receptionists receive a year's training to enable them to act as 'doctor assistants'. The first intake of students have recently completed the course and are being well received by the public.

Although the use of intermediary personnel is on the increase, resistance to their recognition continues and this is often even

stronger in the developing countries than it is elsewhere. It is hard to understand the rationale of such opposition. It is true there is a remote danger of people with less advanced training developing inflated ideas of their own capabilities, but such people can only be relatively few and they will be found at the fringe.

It must be obvious throughout the world, and particularly in developing countries, that we have not the resources or the educational infrastructure to produce the needed number of doctors through university training. Measured against the national incomes of developing countries, the financial burden of educating masses of physicians cannot be tolerated. It seems only logical that this vacuum, which has been created by the present methods of training and practice, must be filled by a well-trained and disciplined corps of intermediary personnel. These team members must have status, and the responsibility which goes with that status, if well-balanced health teams are to be established. The doctor can no longer be an individualist and an authority in his own right. Instead increasingly, and particularly in hospital work, he is becoming the leader of a team in which auxiliary personnel have their rightful place. Such an attitude must now extend from the hospitals to the rural areas and to national health services throughout the world.

If doctors wish to preserve their own status, they have to remember their true role of service within and to the community by the application of scientific thought for the relief of man's estate. Medicine is to do with people. Although the practice of medicine today is so advanced that academic training is essential to a physician, rather than the old type of apprenticeship, the doctor of the future must not lose touch with the general practice of clinical medicine and the means of delivering health care to society. This will involve a new approach to medical education and the establishment of many more training schemes for intermediate medical personnel. The medical profession itself must be prepared to undertake the responsibility for planning the training and the use of medical auxiliaries throughout the world.

# Using medical auxiliaries: some ideas and examples

*KATHERINE ELLIOTT*

The medical auxiliary is a substitute, an alternative to a physician in certain special circumstances. The medical auxiliary is not a substandard doctor.

The medical auxiliary receives a short, practical training. This is often better suited to local educational levels and to the community's immediate needs; it certainly costs considerably less than full professional training as a physician, much of which is theoretical.

Expensively trained physicians should be sensibly used in any country. To delegate suitable responsibilities to specially trained auxiliaries is not a detrimental dilution of standards of medical care.

An adequate number of well trained auxiliaries properly used must be better value than too few doctors desperately attempting the impossible.

Medical auxiliary training schemes should be planned ecologically with a liberal imagination, frequent revision, local and sympathetic evaluation.

The compromise of temporarily accepting the second best instead of the best shows courage combined with commonsense; further progress towards achieving the best is not automatically excluded.

It now makes just as much sense in North Carolina as it does in Kenya to select, train and use medical auxiliaries to deal with the simpler medical problems. In both places this approach to the

shortage of skilled personnel for health care benefits the community and the individual.

**What is understood by the term medical auxiliary?**

It is important to get this clear at the outset to avoid later misunderstandings. The World Health Organisation defines an auxiliary as 'a technical worker in a certain field with less than the full professional qualification'. Prof Maurice King in *Medical Care in Developing Countries* makes a point which is vitally important to the whole idea of medical auxiliaries, namely that an auxiliary is a substitute, an alternative, rather than a complement to the full professional. The auxiliary is not the same thing as a physician but in some circumstances he can substitute for one; he should never be thought of as a substandard doctor.

**Why is there a need for medical auxiliaries?**

The two most obvious obstacles hindering world progress towards better health are lack of money and lack of skilled manpower — the latter in some ways stemming from the former. Both problems beset all countries in varying degrees according to economic development and the type of medical care which the people have learnt to expect. Expectations everywhere are rising with the increasing speed of communication and improving education. Preventable death due to poverty is no longer easily accepted as an unalterable fact of life. Development problems are exercising the thought of many, and no country can afford to be smug. Teilhard de Chardin's 'planetisation of man' is inevitable and one possible, though highly idealistic, solution is that man's health and man's food, so inextricably interlinked, should be taken out of a narrow national, political and economic context and regarded together as world problems needing world solutions.

Meanwhile, realistic remedies must be more widely used. The intermediate technology solution makes excellent sense because it allows for the use of people with different degrees of skill and for the use of different physical resources. It is adaptable to the improving circumstances which it may itself initiate, and it can start at once.

It is a sobering thought for the future of terrestrial evolution that the very simplicity of solutions seems to inhibit their adoption; they require our too immediate action. 'The difficult must be done at once; the impossible may take a little time,' someone said in wartime. To this might well be added: 'But the simple, inexpensive answer to any problem must have no peace-time place'.

*Ad hoc* remedies in the closely related fields of nutrition and health should be acceptable in the short term but conceived as a basis for longer range planning. For example, in many poorer areas protein deficiency could be alleviated by encouraging the cultivation of green vegetables, peas and beans and by the local

1 Pirie, N W (1969):  
*Food Resources  
Conventional and Novel*.  
London, Penguin Books

**Intermediate  
technology means a  
labour-intensive  
approach to health**

**Substitutes for  
physicians**

extraction of protein from inedible leaves and other materials.<sup>1</sup> Within every population, whatever its educational level, suitable recruits can be found and trained as medical auxiliaries to provide at least a better standard of health care than is now available to those most in need of it. Advanced technology may be an eventual better answer, but intermediate technology can help immediately at the existing local economic level.

Physicians are scarce almost everywhere and the cost of their training is soaring as biomedical knowledge expands. Even in the most affluent countries medical care as we know it is pricing itself out of the market, and there is much talk of teamwork in medicine. The composition of the team will be guided by the range of skills readily available in the first instance; the principle is well adapted to an economy of poverty, although equally applicable in richer countries, and it has an inbuilt capacity for gradual sophistication as the opportunity arises. The labour-intensive approach to medical care is that familiar to mass production: *ie*, the final product is split up into parts, each of which can be supplied by someone with a special but limited skill, whose training is therefore less expensive than that of an operator with a multitude of varying talents. In the end, the product costs a little less; more people can therefore afford to buy it. It may not be the same as the craftsman's made-to-measure article; it may not last as long or be as satisfying aesthetically, but it will reach more people who need it and there is no reason why it cannot be redesigned fairly frequently with a view to improvement in the light of experience.

Medical auxiliaries do not replace doctors, but they may substitute for them in certain routine conditions. On occasion they may be more useful than any doctor, as in simple health education or midwifery; but their training will have cost less, and therefore auxiliaries may be paid less than the professionals for whom they may substitute.

Professional prejudice about shifting status is out of place because demands and needs are already compelling this common-sense solution of the downward delegation of responsibility to less expensively trained personnel. Such delegation can mean that a different type of care has to be given, and if this is to succeed it must be acceptable both to the recipient and to the professional who takes final responsibility for the ill person. It is unfair to make too much of some of the current criticisms of the use of medical auxiliaries, whose performance has not so far been properly evaluated; many of the opinions are based on individual experience and personal prejudice. Whether people favour the idea or oppose it, some such cadre within any health service must inevitably emerge to make the decisions for which more highly trained personnel are not essential. Professionals will be constrained,

henceforward, to limit their activities for the most part to leadership, consultation and management.

The gap between the physician and the medical auxiliary should be wide enough to be easily distinguishable. It is important to maintain this clearly visible gap to avoid possible friction, although a carefully controlled upward revision of the status of the more highly trained medical auxiliaries in recognition of their experience and acceptance of retraining should be part of any satisfactory health service. Particularly in the developing countries, a medical auxiliary may have to be prepared to deal with just as wide a range of health problems as any physician although, in view of his substitute status, he will obviously be better prepared to work in the more routine areas of health care such as preventive medicine, maternity and child welfare, environmental health and health education. His ability will depend on his basic level of education and the skill used in planning his training to make the most of all available resources. At certain educational levels a country may be making better use of scarce resources by training many medical auxiliaries rather than a few doctors, because there is a much bigger pool of potential recruits for auxiliary work. There must be, at the same time, a means of making the most of the more capable auxiliaries through further training after intervals of experience.

Auxiliary educational programmes must evolve ecologically in terms of the particular society. They should be planned by people who understand local conditions. Then they must be tried, reshaped and tried again under the conditions in which they are to be used. They should also be evaluated locally without too much cross-cultural discouragement.

### The auxiliary's skills

A medical auxiliary should be able to:

- 1 Undertake the care of the sick wherever necessary in local conditions: *eg*, in the community or at a health centre or hospital
- 2 Either treat the sick himself or else arrange for them to be referred to someone more skilled; he must know enough to judge how urgent is the need for referral
- 3 Think about the community as a whole, assess its problems and needs in order of priority and suggest solutions making the best use of limited resources
- 4 Understand the value of, and be able to undertake, health education with the aim of improving the health of the community, not just of treating the sick
- 5 Apply to his work an open, inquiring mind, receptive to new ideas without necessarily rejecting all tradition

6 Understand what a physician does and how his own work relates to the doctor's role.

**Training  
auxiliaries: the need  
for a simplified  
approach to teaching  
health care**

Physicians, we hope, are taught enough about all relevant subjects to enable them to reason out the probable correct solutions to problems. To train as physicians, people must have an extensive basic education. Medical auxiliaries begin with a lower level of basic education, often very little indeed, and they receive a shorter training, sometimes extremely brief. The amount of responsibility they can learn to take naturally varies with the ability of the student and the background into which he is to fit, both within the community and as part of the country's health service. A medical auxiliary need not be able to make a specific diagnosis, but he must be able to identify an illness sufficiently to know how to manage it. Patients' problems can be grouped in patterns, and the auxiliary learns to choose the pattern which fits the problem from the history, physical examination and simple laboratory tests necessary to confirm the choice, if any is required. The depth to which the problem is to be investigated depends very much on the needs of the patient and on the auxiliary's own limitations in resources and time.

**Teaching of patterns  
of management for  
patterns of illness**

The auxiliary need learn only enough anatomy, physiology and pathology to understand the pattern of management of a disease — he fits the basic science knowledge together with the skills and attitudes he uses in dealing with the sick person. Patterns of management will vary in complexity according to local conditions and resources: *eg*, difficulties of referral. They will possibly involve further diagnostic steps and/or treatment and/or referral.

For instance, the common syndrome of gastro-intestinal infection which presents as diarrhoea, vomiting, abdominal pain, fever and dehydration will require a pattern of management to rectify fluid loss and to rest an overactive digestive system. What drug, if any, is used may depend on whether an accurate diagnosis can be made. Available aids to diagnosis may be a simple laboratory test, the appearance of other similar cases, the likelihood of its being a disease common in the area and within the auxiliary's previous experience, the ease or difficulty of referral to a more experienced consultant and finally a clinical trial of whatever suitable drug is at hand and which is likely to be effective. The degree of fever and distress will influence the choice of drug, if a choice exists, and auxiliaries can learn to gauge the degree of dehydration adequately enough for them to apply promptly whatever relief measures are within their competence. Making the distinction — the differential diagnosis — between this commonly occurring condition, or the equally ubiquitous parasite infestation, and an acute abdominal emergency should not be too difficult and will

not necessarily interfere with the initial general pattern of management.

Similarly, there will be a pattern for the general measures to be adopted in dealing with such conditions as acute pyrexia, respiratory disease, congestive heart failure, head injuries, penetrating wounds, tumours, skin diseases, eye infections, all forms of malnutrition, and so on.

In the same way auxiliaries can learn to assess the health of a community, work out the needs and start patterns of improvement. Medical auxiliaries are recruited from among those with a middle school education (if they have already had more education than this, they should then continue and become full professionals); to average intelligence a strong vocational urge should be added for real success (see J S Horn's description of the recruiting of 'peasant doctors' in Chinese communes<sup>2</sup>). The increasing use of medical auxiliaries in more affluent societies provides a most useful outlet for people with such a vocational urge who lack the educational background necessary to enable them to become full professionals (for instance, the Duke, Denver and other schemes). It must not be forgotten that people already get much advice about their health problems from non-professionals — grandmothers, first-aid workers, herbalists, anyone employed in any capacity in a hospital, surgery or chemist's shop. Persons such as these, given a suitable training, can form part of a health service network to benefit their community. Recognizing the value of extending health care in every society through the use of auxiliaries is rapidly making sense all over the world.

2 Horn, J S (1969):  
*Away with all Pests*  
(see Bib No 9)

*Note* These ideas owe much to the writings of Professor Maurice King, Dr John Bryant and Dr Rex Fendall. Please see the attached annotated bibliography for details of these

### *SOME EXAMPLES FROM COUNTRIES ALREADY TRAINING AND USING MEDICAL AUXILIARIES*

**USA — North  
Carolina: the Duke  
University Scheme;  
the physician's  
assistant**

In North Carolina the physician/population ratio is low and trained personnel are short in all areas of medical care. Physicians in the Duke University Medical School decided to train assistants to extend or augment their own work in a variety of settings or circumstances. They were prepared to take the responsibility themselves for using such assistants under constant, direct supervision. The assistant may either have highly specialised skill (*eg*, in a renal dialysis unit) or broad general skills suitable to family medical practice. These are the criteria used in selection:

- 1 High-school education: *eg*, 10-12 years' schooling
- 2 Personal recommendation
- 3 Good results in intelligence and personality tests

- 4 Previous experience in patient care: eg, as medical corpsmen in military service, practical nurse training, etc
- 5 Personal interview.

A two-year course started in 1965 with three recruits. There were nine the following year, and there have been 12 each year since. Over 1000 people ask each year for information about the course, but selection is rigorous. Graduates so far are employed either within Duke University Medical Centre, or by private physicians, or in other hospitals or medical centres.

The work of the physician's assistant is very like that of the junior resident doctor, but the assistants do not make diagnoses, write prescriptions or initiate treatment. They take histories, make physical examinations, carry out many routine procedures such as venepunctures and intubations, and supervise tests. They present the patient's case to the physician.

Physician's assistants have been accepted by both physicians and patients, but their legal status is difficult. It may be that the physician will have to be licensed to employ the assistant. Another suggestion is that they should receive a degree at Bachelor of Science level. The Association of American Medical Colleges has set up a task force to report on training programmes for physician's assistants. Dr Paul J Sanazaro, Director of the National Centre for Health Services Research and Development, spoke recently on *The R and D Approach to Health Manpower in the 1970s* to the American Medical Association Conference on Physician Support Personnel.

The Duke training scheme lasts two years. A preliminary nine months of academic courses covers applicable basic science with some introduction to clinical medicine. Teaching is organ-orientated and is combined with relevant laboratory work and the learning of clinical procedures. During the last six weeks students learn physical diagnosis, about community health and such specialised procedures as electro-cardiography, radiography and data processing.

Four periods, each of eight weeks, follow and are spent in clinical rotations. Students work in controlled surroundings in hospital or medical centre in defined areas of medical care. They apply information already learnt and are individually taught additional special skills. The first period is spent on in-patient ward work, the second in out-patient work, and the third in community medical work. The last period involves special experience with public health units, insurance agencies and voluntary health agencies. The rest of the two-year course is spent in special training, depending on the trainee's particular interest and future plans, in cardiology, paediatrics, neurology, general surgery, etc.

**Benefits of the Duke  
Scheme already  
evident**

Already certain results have been noted:

- 1 A practical model has been developed showing how the output of the physician in community practice can be increased without detriment to standards of care
- 2 The scheme shows a way of producing highly skilled technicians for special care areas within a medical centre
- 3 If this type of personnel could be produced in sufficiently large numbers, the scheme shows how the rise in medical costs can be slowed down
- 4 The interests of the medical school and the social sciences division of the university have been brought closer together for better interchange of ideas and perhaps joint research
- 5 Medical students and newly-qualified physicians see that delegation is possible and teamwork worthwhile
- 6 Those who would like to undertake medical care but who lack the proper educational background can now be accepted for a rewarding career.

**USA — Colorado:  
the Denver paediatric  
nurse practitioner**

This scheme started because there were not enough paediatricians to provide adequate health care in the area. The programme is now four years old. The University of Colorado Medical Centre recruits graduate nurses, who undergo a four-months intensive course in the theory and practice of paediatrics to enable them to take a greater part in the provision of health services in low-income areas and to aid paediatricians.

The nurses take histories, perform comprehensive physical examinations, do the relevant simple laboratory tests and make development assessments of all kinds. They give almost complete well-child care and can evaluate and manage many acute and chronic disorders. They can assess the acuteness and severity of a disease, help in emergencies, and are expert counsellors in child-rearing. The nurses work in child health stations in low-income and rural areas as part of the state health service and they also help in private paediatric practice. They give great support to mothers in the neo-natal period and make many home visits. On average the nurse can cope unaided with 70 percent of cases, referring about one case in four at the most to the paediatrician. In private practice, more than half the parents think that children are getting better care now from the joint attention than from a doctor alone, as was the case previously.

Each nurse trained allows a physician to increase his potential by one-third. The nurse helps bring together the public and private sectors of medicine. The main difficulty seems to be the re-orientation of the nurse towards acceptance of more and different responsibility and initiative. On-the-job training will not accomplish this role transfer, and the four-month special course is an essential part of the scheme.

### **UK: Attachment of nursing services in general practice**

In recent years there has been an increasing trend in the UK towards the attachment of members of the domiciliary nursing services to general practitioners. This began in 1963 with the Gillie Sub-Committee which suggested that domiciliary nursing staff should be attached to family doctors. This suggestion was endorsed by the Royal College of Nursing and the College of General Practitioners. In 1968 the Health Services and Public Health Act removed the legal difficulties, and attachment schemes have now been introduced by many local health services.

Health visitors, district nurses or midwives may be attached to a general practitioner or group practice; sometimes to more than one practitioner or group. The district nurse or domiciliary midwife provides services to patients on doctors' lists. She is able to consult regularly with the doctor or doctors concerned.

Health visitors work in similar fashion, but also may provide such services as child health, school health and health teaching to everyone in the area, not merely to the people on doctors' lists.

Some local authorities employ health visitors and nurses to work in a specified hospital department (eg, geriatric, diabetic) to facilitate liaison and cooperation between the hospital department and health personnel responsible for domiciliary care.

The idea behind this method of providing health care to the public is that of the community health team. Such a team will provide a full range of both personal and preventive services. It has been found that attachment schemes help general practitioners to provide more comprehensive care and a better quality of care for their patients. The new trend towards health centres fits well with the trend towards group practice and the attachment scheme described above. Social workers are also now being included in these community health care teams to help with the non-medical problems of patients.

A report<sup>3</sup> published at the end of 1970 notes that where nurses make a first visit to the patient it must be understood that this visit is not for the purpose of diagnosis. The doctor remains

3 *Reference* Working Party set up jointly by the Society of Medical Officers of Health, the Royal College of Nursing, the Health Visitors' Association, the Queen's Institute of District Nursing, the Royal College of Midwives, the Association of Supervisors of Midwives and the Royal College of General Practitioners (1970): *Attachment of Nursing Services in General Practice*. Hemel Hempstead, UK: Educare

accountable and the attachment schemes are not an attempt to relieve the general practitioner of responsibility, but to make more effective use of both medical and nursing skills to meet the needs of the community.

It is clear that attached personnel of this type in the UK are not medical auxiliaries in the exact sense of the term as defined earlier. It is perhaps important, nevertheless, to include a brief description of this growing acceptance of intermediate technology in health care within the British National Health Service

#### **USSR: The ordinary or general feldsher**

Their history is long. In 1700 Peter the Great started a corps of military feldshers (field barbers) who were trained to provide medical care to the army. These men, when they retired, often settled in rural areas which lacked doctors and practised their skill among the local people. After 1860 a system of local government was set up in place of serfdom, but the districts were mostly too poor to pay physicians to provide a medical care service and instead this function fell to the lot of the feldshers. Schools were opened in which they received some kind of training for two years, and by 1913 their numbers had risen to 30,000.

After the Russian Revolution there was an attempt to upgrade the more skilled feldshers to doctor status and to stop training at feldsher level, but despite a big increase in the number of doctors the medical auxiliary continued to be needed. Feldshers remain very much part of both urban and rural medical care in the Soviet Union.

In urban areas there are plenty of doctors, and feldshers function as their assistants under close supervision. It is in the rural areas that the feldsher acts as a substitute for a physician and he may look after up to 1500 people. He (or she) is responsible for preventive medicine and health education and also looks after the sick and refers patients to the district hospital for treatment by the physician there. Close supervision of the feldsher's work in diagnosing and treating disease is an accepted part of the Soviet medical care system, although there are indications that this does not occur in the remoter areas.

Recruits for feldsher training with eight years of general education receive 3.5 years of special training; those with 11 years of general education receive 2.5 years of training. Recruits are matched for language and cultural background to the district in which they will work, but the training programme is meant to be uniform throughout the country and is similar to the curriculum for medical students, though in less depth. In other words it is to

a great extent theoretical rather than purely practical.

Those who do really well can proceed to medical school immediately. Others can apply for physician training after two or three years of feldsher experience. Between 20 and 30 percent of Russian medical students have previously had feldsher training.

Promotion and in-service training are important. Feldshers have high status in the rural communities and receive good pay for their services.

Increasing responsibility carries increases in salary. Feldshers are supervised by physicians rather than by more experienced feldshers, and instruction in feldsher training schools is in the hands of doctors.

It is admitted that the feldsher system gives rise to problems: resentment of the 'second class doctor' in rural areas where the physician/population ratio is relatively low. Experiments are being made, and there is little doubt that if it is clearly laid down just what *job* can be done by a non-physician as well as or better than a doctor — for example in preventive medical services, health education, screening, etc — then there is no problem. The medical auxiliary within his narrower scope provides the better service.

**SW PACIFIC  
ISLANDS: the Fiji  
scheme for training  
assistant medical  
officers**

The idea of training auxiliaries who either assist or substitute for doctors started in the S W Pacific almost 100 years ago. There were no European doctors to work in the area, and the Fiji School of Medicine was established in 1878 to train local 'vaccinators'. The course has been lengthened gradually over the years and the recruits, who are native to the S W Pacific Islands, now receive five years' training before becoming Assistant Medical Officers with the Diploma of the Fiji School of Medicine. To practise in the Fiji Islands, they must then serve a further year as hospital resident doctors.

This Diploma is valid only for medical practice within the islands and in Government service. A M Os have access to fully qualified physicians, also in Government service, when they need to refer a patient. They work either as assistants to doctors or as completely independent practitioners, subject only to minimal supervision. They are supported by other health workers, also locally trained — nurses and sanitarians.

The A M O is the official representative of the Fijian Government responsible for enforcing health regulations and supplying health services in his area, and for keeping the local health records. His work is mainly curative and he has little time for health educational activities, but the A M O provides on the

whole excellent care. Promotion and in-service training reward exceptional ability.

There has been no local university medical school. Recruits for A M O training come straight from the local secondary schools and the course of training is specially geared to the level of education reached before admission and to the health needs of the communities in which the A M O will be working.

## **Medical auxiliaries in AFRICA**

Many different types of auxiliaries are being trained and employed in Africa. In French-speaking areas the idea is far from new. The system was meshed with French medical tradition and springs from the medical schools which the French set up in Africa. French African auxiliary tradition is being omitted from the examples to be considered here.

Ethiopia is taken on its own; likewise Nigeria. Medical auxiliaries in East Africa (apart from Ethiopia) form more of a body of similar groups, because even in a country where there is a medical school this is still something quite new and the background to the developing health service is that of non-indigenous practitioners; doctors coming from other countries to serve for a period and making use of local people as assistants.

Once there is a local medical school, new problems arise. If its qualification is recognised internationally, how are local working conditions to be made sufficiently attractive to keep newly qualified doctors happy at home without coercion and without bankrupting the country? In any case their number will be pitifully small in the face of the increasing demand, and their initial enthusiasm could soon be dampened as they are faced with impossible tasks. Teamwork has been recognised as essential, as has the provision of an extensive supporting infrastructure in all governmental health services in East Africa, whether rural or whether for the less wealthy population within the cities. The shortage of doctors is more noticeable in the rural areas because distance, as well as pressure of work, takes up doctors' time, but the principle of making use of auxiliaries applies in town and country, with added emphasis on the need for good referral and supervision facilities in rural areas.

## **ETHIOPIA**

The population of the country is about 25 million people and it has had a scheme for training health auxiliaries for the last 35 years. It has had a medical school since 1964 and its first graduates were produced in 1968. There are fewer than 400 doctors working in Ethiopia and

only 70 of them are Ethiopian. They are helped by just over 200 medical auxiliaries.

The literacy rate is very low among Ethiopians – only 13 percent go to school at all, and only four percent go beyond primary school level.

In 1935 regular training for health personnel was begun at the same time as the training of sanitary personnel. In 1954 the Haile Selassie I Public Health College and Training College was established at Gondar as the beginning of a real development of health manpower and basic health services. Gondar College is unique because it trains health workers of various categories together. A special category, that of Health Officer, has been created. The Health Officer leads the rural health team, aided by the community nurse and the sanitarian.

Ethiopian Health Officers are medical auxiliaries. They are recruited from among candidates with the maximum 12 years of schooling and they receive a four-year training. The emphasis is on preventive medicine with a team approach, and training is almost equally divided between academic and practical work. It ends with a year of closely supervised practical field experience in a training health centre. The Health Officer learns preventive medicine, basic clinical medicine, health administration, health aspects of community development and methods of health education. He is in charge of a health centre and is responsible for all its activities. In many of the rural areas he has to work with very limited supervision and the referral of patients is difficult. His responsibility can be great.

In 1962, the Gondar school was taken over by the Haile Selassie I University and the training of the Health Officer became more academic, thus tending to widen the acceptable gap between the Health Officer and the rest of the team. Health Officers were then found to be less willing to work in the more remote areas.

In 1963, plans were made for founding a medical school in Ethiopia to meet the tremendous shortage of indigenous doctors, and about 27 Health Officers were selected from among the Gondar graduates to receive a modified five-year medical course which took into account their previous training and experience. The idea was that when these Gondar entrants graduated from the medical school they would be full physicians with previous wide experience, and thus well-fitted to fill key public health positions in Ethiopia.

In Ethiopia there is also a strong cadre of 'dressers', who receive a two-year training and who occupy an important place in the country's health services. Some work in hospitals and health centres under supervision, but many work in the field and go from village to village taking care of local health needs under only

intermittent supervision. They receive a simple training in clinical medicine, but there is now a much greater effort to emphasise the preventive and public health aspects and to introduce a system of in-service training, refresher courses, and a proper career structure. These auxiliaries must now have reached grade six of elementary education before they are accepted for training.

Now that the new medical school is producing doctors, the position of the Ethiopian Health Officers must be clarified and an attractive career structure offered. There is also a great need for more lower grade auxiliaries to form a supporting infrastructure.

## UGANDA

The country has a population of eight million and has had a training scheme for medical auxiliaries for over 50 years. Since 1922 it has had a recognised medical school which has served Kenya and Tanzania as well as Uganda. The number of doctors working in the country is about 500, and there are some 400 medical auxiliaries.

Auxiliary training is based on Mbale and lasts for three years. Selection is from school-leavers who have passed the Senior Cambridge School Certificate; that is, who have completed their secondary school education. About 25 to 30 auxiliaries are produced each year and it is planned to increase recruitment. They receive a training which is based on nursing theory and practice with the addition of training in the recognition of clinical signs and symptoms and in the administration of health centres and bedded dispensaries. They are taught during their first year by a senior medical auxiliary and during the second and third years by hospital medical officers and visiting specialists.

The cost of the three year training is rather less than £500. The cost of training a medical student at Makerere University is about £10,000. The medical auxiliary is responsible for the health of an area which is based on a health centre with sub-centres and dispensaries, and his duties are very much the same as those of the medical auxiliary in the Sudan.

## SUDAN

The country has a population of 13 million people and has had a medical auxiliary training scheme for over 50 years. It has one of the older medical schools in Africa. There are 700 doctors working in the Sudan, helped by over 750 medical auxiliaries.

Auxiliary training is based in Omdurman and lasts for two years. Selection is from among male nurses with five to 10 years of experience. It has some geographical basis, since auxiliaries are of greater value where they are sympathetic to the local culture. The average intake is now 50 students a year. Before training as nurses, the students will have had from four to six years of

primary school education. They are literate, but use Arabic, whereas medical students are trained in English.

Throughout their training the auxiliaries remain in constant contact with patients and they work as they learn, mainly by word-of-mouth teaching. The cost of the training is between £300 and £400 and during it the auxiliary earns between £3 and £4 a week. It costs £1000 a year for each medical student at Khartoum University Medical School. Total cost of producing a doctor is therefore approximately £6000, while the total cost of producing a medical auxiliary is £750.

The auxiliaries act as local representatives of the Health Ministry; they are responsible for environmental health, immunisations, control of epidemics, registration of births and deaths and administration of the local health centres. They work with the auxiliary midwives and the health visitors and see the patients coming to the health centres. If they cannot treat a particular case, they decide where the patient should be referred to see a physician. In rural areas, the auxiliary is also responsible for the care of in-patients in local hospitals.

Supervision, either direct or remote, is part of the system and is well maintained. There is a definite career structure for the auxiliary, who is clearly distinguishable from the physician, and is in fact better accepted in rural areas.

## TANZANIA

Tanzania has a population of 12.5 million people and has had a medical auxiliary training scheme for many years. It has a new medical school which has still to graduate its first doctors. There are 400 doctors working in Tanzania and just over 200 medical auxiliaries.

Tanzania is an example of a country in which standards for auxiliaries have been raised progressively while the previous cadres have been retained. Thus the country at the moment has some four levels of medical auxiliary, all of whom serve as substitutes for doctors.

The rural medical aide has had eight years of schooling and receives a three-year training for work at dispensaries. The medical assistant has had 10 years at school and receives similar training.

Assistant medical officers are recruited from among the ranks of medical assistants and receive nine months' further training, which includes public health and obstetrics; these subjects are not taught to medical assistants.

Rural medical aides can be chosen for further training to become medical assistants. Medical assistants in turn get further training to become assistant medical officers, who can then take charge of health centres, whereas medical assistants do only

curative work in hospitals.

The medical school will turn out licensed medical practitioners. It is not yet known whether the assistant medical officer will have the opportunity of being upgraded to becoming a licensed medical practitioner with further training.

## KENYA

The country has a population of 10 million people and has had a medical auxiliary training scheme for 40 years. It has a new medical school which is just graduating its first doctors. There are about 800 doctors working in Kenya and about 600 medical auxiliaries.

Auxiliary training takes place at each of the main provincial centres and the course lasts four years. Recruitment is from school-leavers with Senior Cambridge School Certificates. The best students receive advanced training to become clinical assistants, who work in hospitals as temporary replacements for physicians.

The cost of training a medical assistant is about £1000. Training a medical graduate is unlikely to cost less than £10,000.

Medical assistants are in charge of rural health centres as part of the Kenyan concept of integrated medicine. They are responsible for both preventive and curative medicine in their area and work as part of the health team, which receives two months' training together in teamwork.

The education of health care personnel in Kenya is under constant review in response to changing needs and conditions. It is planned to train about 70 medical auxiliaries each year and to recruit from those with middle-level schooling.

## MALAWI

The country has a population of four million people and has had a medical auxiliary training scheme for 35 years. There is no medical school and none is planned for the near future. The number of doctors is about 80 and the medical services depend almost entirely on between 500 and 600 medical auxiliaries.

Medical auxiliary training is based on hospitals in Blantyre and Zomba and lasts for three years. Selection is from candidates with six years of basic education. The first two years are spent in the equivalent of nursing training; women spend their third year learning midwifery and men learn general medicine and surgery.

After their three years of training the medical auxiliaries are responsible for the health of 90 percent of the population of Malawi. Some 120 health centres and district hospitals are manned entirely by medical auxiliaries, and supervision by the few doctors available may be infrequent or remote.

The cost of training a medical auxiliary in Malawi is £1000. At present, 43 Malawians are training to become doctors in medical schools elsewhere.

## NORTHERN NIGERIA

The population of Nigeria is about 63 million people and they are looked after by less than 2000 doctors, only about half of whom are Nigerian. In the rural areas of Northern Nigeria there is only one doctor to 150,000 people. At the moment much of the health care is provided by health auxiliaries (*eg*, community nurses and dispensary attendants) who are not medical auxiliaries. These are recruited from primary school and receive a simple training at Kano.

There are three Nigerian medical schools: Ibadan, Lagos and the new school at Ahamadu Bello, Zaria, which expects to graduate its first doctors in 1973.

It is hoped soon to start a scheme for training medical auxiliaries at Zaria through a new Institute of Health closely associated with the new Ahamadu Bello University medical school, but this had not materialised by March, 1971. The intention is to provide a three year training for recruits from secondary school and these medical auxiliaries will provide a reliable infrastructure for the new Northern Nigerian health services.

Selection of candidates for medical auxiliary training is to be from all areas of Northern Nigeria. They will be chosen mainly from students who have completed secondary school education, but where necessary a special preliminary instruction course is to be given to make sure that all areas are represented in the scheme, even if at first deficient in educational infrastructure.

The doctors now being trained at the new medical school will lead teams of medical and health auxiliaries, and both doctors and medical auxiliaries will receive practical training together in field conditions. Principles of delegation, supervision and selection for referral will therefore be already accepted before either doctors or medical auxiliaries graduate.

Nigerian medical auxiliaries will undertake responsibility for immunisation and vaccination programmes, community hygiene and sanitation schemes, and education in health and nutritional needs. They will also be able to deal with many minor diseases, selecting the more serious cases for referral to the physician. The medical auxiliary is to be part of the health team led by the doctor. The medical auxiliary will himself supervise the work of less highly trained health auxiliaries, who will act as his assistants.

The population of China is more than 700 million and more than three quarters of this number live in the vast rural areas. A high proportion of the doctors work in towns and cities. Although a great effort is being made to train large numbers of new and traditional-style physicians, their number is still inadequate.

From 1964 onwards, mobile medical teams were sent out from the cities to set up rural health services. One of their most important tasks was to train medical auxiliaries from among the local people. These are the so-called peasant doctors.

The idea is that for each of the production brigades which make up one of the 70 000 People's Communes, there will be a trained peasant doctor. The peasant doctors will work with a number of sanitary workers and midwives to provide a health service for the millions of peasants who would otherwise lack any form of modern health care. The peasants are all literate, but few have had more than five years of school. A candidate for training as a peasant doctor is chosen by his production brigade because he is keen to train and is intelligent, and also because he shows qualities such as unselfishness, compassion and responsibility.

The training of peasant doctors is undertaken by the area medical team and is especially planned to occupy only the slack four to five months between agricultural seasons, since it is considered more important than anything else that the recruits should remain peasant farmers deeply rooted in their communes.

Training takes place over three years in these three 4/5 month periods and is streamlined to mix theory and practice from the beginning. The students live with the medical team and learn continuously, so that even in the brief first period of training they learn enough to be of use when they go back to their villages. They have a rough understanding of the structure and function of the body, can diagnose and treat a few common minor diseases and know the essentials of environmental hygiene. Most important, they know how to recognise serious conditions and the danger signals indicating the need for expert help. The health care they are able to provide in their villages is supported by a telephone link and weekly visits by the medical team to support, advise and encourage them.

After the third period of training, they are qualified as peasant doctors, but in-service training continues and continuous support is provided. The peasant doctors are very much part of the community they serve and this mutual trust and confidence undoubtedly contribute a great deal to their remarkable success.

# Annotated bibliography

The bibliography which follows makes no pretence at being comprehensive; it does, however, contain most of the significant published material of the last five to 10 years which is concerned with medical manpower and particularly medical auxiliaries. The bibliography is not intended as a guide for the rural (or other) health worker as such, but rather for health planners and others interested in questions related to the appropriate utilisation of medical manpower. Items dealing with nutrition and health education have not been included. Part I, which is concerned with overall health planning, includes only a few of the most useful publications in this field.

Each section of the bibliography is divided into two parts; the first includes material such as books or reports which have been published as independent documents. The second part of each section is made up of articles or other material, only available as parts of larger publications. Many interesting mimeographed documents have had to be excluded because they are not readily available. This was particularly the case for many valuable World Health Organisation reports, which are not usually available except on application to the international headquarters in Geneva or to one of the six regional offices (Washington, Copenhagen, Brazzaville, Alexandria, New Delhi and Manila).

It is important to note that the auxiliaries referred to in Part III are not nursing aides, or the like, but specifically medical auxiliaries as outlined earlier in this publication.

## ABBREVIATIONS

*Br med J*  
*Bull NY Acad Med*

*Can J publ Hlth*  
*E Afr Med J*  
*Indian J med Educ*  
*J Am Geriat Soc*  
*J Am med Ass*  
*J Human Resources*  
*J med Educ*  
*J Soc Hlth Nigeria*  
*J trop Med Hyg*  
*Med Care*  
*Papua New Guin med J*  
*Publ Hlth Rep*  
*Trans R Soc trop Med Hyg*

*W Afr med J*  
*Wld med J*

British Medical Journal  
Bulletin of New York Academy of Medicine  
Canadian Journal of Public Health  
East African Medical Journal  
Indian Journal of Medical Education  
Journal of American Geriatrics Society  
Journal of American Medical Association  
Journal of Human Resources  
Journal of Medical Education  
Journal of Society of Health of Nigeria  
Journal of Tropical Medicine and Hygiene  
Medical Care  
Papua and New Guinea Medical Journal  
Public Health Reports  
Transactions of Royal Society of Tropical Medicine and Hygiene  
West African Medical Journal  
World Medical Journal

# I Health planning

## BOOKS AND REPORTS, ETC

**1 Abel-Smith B (1963)** *Paying for Health Services. A Study of the Costs and Sources of Finance in Six Countries* Public Health Papers No 17. Geneva: WHO

A study in detail of six countries' health expenditures. This is a companion study to the one cited in No 2 and was carried out in Ceylon, Chile, Czechoslovakia, Israel and the United States

**2 Abel-Smith B (1967)** *An International Study of Health Expenditure and its Relevance for Health Planning* Public Health Papers No 32. Geneva: WHO

An analysis of the amounts and ways in which countries spend money for health care; the results of an international survey conducted by WHO

**3 Bryant J H and Arnstein G (1965)** *Report to Thailand on Health Services, Health Personnel and Medical Education* New York: Rockefeller Foundation

This excellent report presents an account of health services in Thailand with recommendations for their improvement, including adjustments in the rural/urban imbalance. Feasible objectives over the next 25 years must be based on the satisfaction of 'real needs' and be defined within the terms of national demography and economic and educational resources. All health manpower requirements should be based on these decisions and not on the simple basis of pro rata population ratio (See also Bib Nos 34 and 100)

**4 Bryant J H (1969):** *Health and the Developing World* Ithaca and London: Cornell University Press

Dr Bryant argues that the root cause of the present difficulty in providing health care services in developing countries is the dichotomy between the aims of medical schools and existing medical delivery systems. As long as the former accept standards drawn from more affluent countries this dichotomy will continue. Dr Bryant suggests that medical education must be relevant to existing needs and possibilities and a substantial part of all health care should be delivered by medical auxiliaries. This book is a major contribution which had the support of a distinguished committee of medical men

**5 Centre for Development Studies, Caracas (1965)** *Health Planning; Problems of Concept and Method* P A H O Scientific Publications No 111. Washington D C: Pan-American Health Organisation

The development of the Cendes methodology for health planning in Latin America. This particular approach attempts to set priorities for health care planning which take into account the incidence of a given disease, the characteristics of the population affected, and the possibility of a reduction in morbidity and mortality resulting from the disease

**6 Fry J (1969)** *Medicine in Three Societies* Aylesbury: MTP Chiltern House

A British general practitioner's personal analysis and comparison of three systems of medical care: in the USSR, the USA, and the UK. The book includes references to the training and utilisation of 'middle grade' medical workers

**7 Gish O (1971) *Doctor Migration and World Health*** London: G Bell and Sons

The economic background of the health services of developing countries is analysed in the context of 15 African, Asian and Caribbean countries. The international migration of thousands of medical graduates from these parts of the world is the starting point for the investigation (see also Bib No 42)

**8 Goodman N H (1963) *Alternatives to Hospital Care*** Strasbourg: Council of Europe

A report of a study, undertaken by the Council of Europe's Committee of Experts on Public Health, of alternative methods of providing hospital care or its equivalent in European countries including Turkey

**9 Harris S E (1964) *The Economics of American Medicine*** New York: Macmillan

An important contribution to an overall understanding of the American medical scene. This senior economist examines virtually every aspect of the American health industry. The sections on manpower are particularly useful

**10 Horn J S (1969) *Away with all Pests*** London: Hamlyn

Dr Horn worked for 15 years as a surgeon in the People's Republic of China. He describes how traditional and modern medical practices can be blended successfully; how an entire population has united in successful campaigns against endemic diseases. His first-hand experience of the Chinese approach to the problem of rural health and the on-the-spot training of peasant doctors is very relevant to developing countries everywhere

**11 King M H ed (1966) *Medical Care in Developing Countries*** Nairobi: Oxford University Press

Based on a symposium held at Makerere and subtitled by Prof King, its editor, *A primer on the medicine of poverty*, this book embodies the concept of intermediate technology in health care from many different angles. The axioms suggested are applicable in most countries whatever their stage of development, and the book contains very many practical suggestions for health planning and for the use of medical auxiliaries

**12 Klarman H E (1965) *The Economics of Health*** New York: Columbia University Press

The most comprehensive review of the field of health economics yet attempted. The book is not directed towards any country but rather towards the emerging discipline of health economics which hardly exists as yet outside the United States. It also contains a useful bibliography

**13 Lathem W and Newbury A eds (1970) *Community Medicine*** London: Butterworth

This is a report of the 1969 Bellagio Conference in Italy where experts concerned with teaching and application of health programmes in rural areas came together from many parts of the world and compared their results. Essential reading for any doctor concerned with developing health services in rural areas

**14 McKeown T (1965) *Medicine in Modern Society*** London: George Allen and Unwin

This book discusses the role of the teaching hospital and is largely concerned with medical education. To produce a balanced teaching hospital, responsibility must be assumed for all medical services and the needs of rural areas cannot be neglected

**15 New York Academy of Medicine 1967 Health Conference (1968)** Planning for Community Health Services: Perspectives for Action *Bull NY Acad Med* vol 44 no 2

Although the conference was concerned with problems in the United States, many of the questions raised and approaches suggested are important for health planners everywhere. For example, Spiegel's paper warns of the dangers stemming from the parochialism of many professions, producing a fragmented and uncoordinated approach to the development of a community. Goals of a higher order must transcend the professional fields of the health manpower and city planners. Papers by McKeown, Guthrie and Rosenfeld are equally useful

**16 Prywes M and Davies A M eds (1968) *Health Problems in Developing States*** New York: Grune and Stratton

The proceedings of the Rehovoth conference. This book stresses the necessity for planning and timing in the development of health services for the benefit of the whole of a community. It includes Fendall's views on health centres and the usefulness of auxiliaries and stresses the need for priority to be given to rural problems

**17 Record of Proceedings of the First Commonwealth Medical Conference, Edinburgh 1965 (2 vols)** London HMSO

**18 Report of the Second Commonwealth Medical Conference, Kampala 1968 (3 vols)** Kampala: Commonwealth Secretariat

The papers presented at these conferences include some reference to the need for mutual aid between Governments but are mainly concerned with problems of health care within the different Commonwealth countries.

Many of the papers refer to questions of manpower training and development. The Kampala volumes contain a useful appendix of Commonwealth health manpower statistics

**19 Rosenfeld I I (1963) *Planning and Allocation of Medical Personnel in Public Health Services*** Translated from the Russian and published for the National Science Foundation, Washington D C, by Israel Programme for Scientific Translations, Jerusalem

A fairly early study of Soviet health manpower techniques. This is not an easy book but is one of the few detailed accounts of an attempt to give a scientific basis to health manpower planning

**20 Somers H M and Somers A R (1961) *Doctors, Patients and Health Insurance*** Washington: The Brookings Institution

Broad-ranging and basic to all aspects of health care in the United States. Although the emphasis is on the organisation and financing of medical care, aspects of manpower development and utilisation are discussed. This work remains a basic document in the field, although of limited applicability to countries other than the United States

**21 Stampar A (1966) *Serving the Cause of Public Health*** Zagreb

The selected papers of Andrija Stampar, a founder of the World Health Organisation, and one of the most internationally-minded of the physicians, teachers and public health administrators of this century. He saw the physician also as a teacher and social worker and the community as responsible for fulfilling the individual's right to health. He had worldwide experience as an adviser and the book includes his experiences from China to Peru

**22 WHO Technical Report Series No 350 (1967) *National Health Planning in Developing Countries*** Geneva: WHO

Health planning as developed by a WHO expert committee. Emphasis is on the organisation of the planning machinery rather than on problems of implementation

**23 Wolstenholme G E W and O'Connor M eds (1965) *Man and Africa*** (Ciba Fdn) London: Churchill

The discussion of a group of experts who assembled in Ethiopia in 1964 to survey the problems and potentialities of Africa as a whole. Two of the papers by Prof T A Lambo and Dr H B L Russell are particularly relevant to the question of socio-economic change in Africa and the training and use of medical auxiliaries

**24 Wolstenholme GEW and O'Connor M eds (1967) *Health of Mankind*** (Ciba Fdn) London: Churchill

Proceedings of a small international conference to discuss the assessment of the present health of mankind, major factors aggravating world health problems and the world resources of skilled manpower, with particular reference to education, training and research. The need for better medical teamwork is emphasised, and the book includes a valuable chapter by Dr A L Kaprio on medical personnel and the development of realistic health services

**25 Wolstenholme GEW and O'Connor M eds (1971) *Teamwork for World Health*** (Ciba Fdn) Edinburgh and London: Churchill Livingstone

The papers and discussions of a small group of international experts on the use of teamwork in medical care; the better use of health resources is considered from many different disciplinary angles. Contemporary experiments, many of them controversial, in different countries are described.

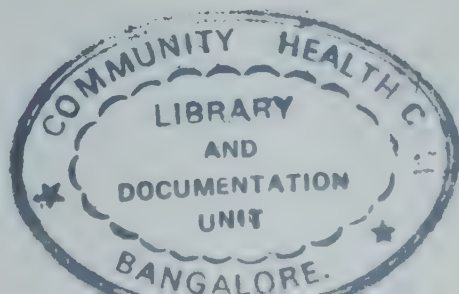
**26 World Health Statistics Annual 1966, Vol III (1970) *Health Personnel and Hospital Establishments*** Geneva: WHO

The statistics are presented by country under the headings of health personnel, hospitals or other medical establishments with beds, hospital utilisation, and sex and age distribution of personnel in selected occupations. This edition is based on a new type of questionnaire giving more prominence to intermediate level auxiliary personnel

ARTICLES

**27 Bryant J H (1968) The Gap between Biomedical Technology and Health Needs in Developing Countries** *Science and Technology in Developing Countries* pp 1 - 29, ed Zahlan and Nader. London: Cambridge University Press

An excellent background article to all aspects of health planning. Dr Bryant points out that some of the most serious diseases confronting the less developed countries have not yet been significantly influenced by advances in biomedical technology



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**28 Davies A M (1962)** Priorities in the Planning of Health Services in Emerging Countries *Report of the Conference on the Application of Science and Technology for the Benefit of Less-Developed Areas* (paper E/Conf 39/F/18) Geneva: United Nations

Stresses the importance of the coordinated approach to health care as part of overall planning, and the need for development of health programmes in keeping with socio-economic change. Health centres should be the focal points of community development programmes with rural health posts staffed by auxiliaries, who at first may be trained only to recognise the most prevalent diseases, but with rising standards through continuous training

**29 Fendall N R E and Southgate B A (1962)** Principles and Priorities and Public Participation in Planning a Programme for Health *Report of the Conference on the Application of Science and Technology for the Benefit of Less-Developed Areas* (Paper E/Conf 39/F/5) Geneva: United Nations

The authors argue that a comprehensive health service plan must make provision for the main health activities of curative, preventive and promotive medicine. It must be based on such considerations as demography, patterns of disease, socio-economic conditions (and political climate) as well as upon the 'real needs' of the people. A service taking a broad ecological approach is the most appropriate for developing countries and should comprise four essential components: policy and planning, service, training, and of course research and evaluation

**30 Fisek N H (1971)** An Example of an Integrated Approach to Health Care; the Turkish National Health Services *Team-work for World Health* (Ciba Fdn) ed Wolstenholme and O'Connor. Edinburgh and London: Churchill Livingstone

Describes the progress made since 1960 in the provision of rural health services after Turkish health services were nationalised. New medical schools emphasise the community aspects of health and patient care, and health teams are trained together to take charge of districts. The results from the pilot scheme appear impressive

**31 Morley D (1963)** A Medical Service for Children under Five Years of Age in West Africa *Trans R Soc of trop Med and Hyg* vol 57, no 1, pp 79 - 88.

This is an early account of the provision of health care through the Under-Fives Clinics as they were first developed in Ilesha, West Africa. Mortality figures before and after the development of the programme are given (1957: 440 per 1000; 1965: 120 per 1000). Some effort is also made to cost the service

## II

# Health manpower

### BOOKS AND REPORTS, ETC

#### **32 Abel-Smith B and Gales K (1964)**

##### *British Doctors At Home and Abroad*

London: G Bell and Sons

The first serious attempt to collect data on the size of British medical migration following some years of controversy about the subject

#### **33 Baker T D and Perlman M (1966)**

##### *Health Manpower in a Developing Economy*

Baltimore, Md : Johns Hopkins

The first in the Johns Hopkins Health Manpower series. A pioneering effort which attempts to measure the supply and demand for health manpower in Taiwan. The emphasis of the methodology employed is on the need to bring supply into balance with effective economic demand (see also Bib Nos 44 and 55)

#### **34 Bryant J H and Arnstein G (1965)**

##### *Report to Thailand on Health Services, Health Personnel and Medical Education*

New York: Rockefeller Foundation

Already mentioned in Part 1, the chapters on manpower are equally important. As maldistribution of personnel aggravates the rural shortage, a medical education programme that is designed to increase interest and understanding in rural medicine is described. 'The type of physician required by rural Thailand is a good general practitioner, versed in manual skills, orientated to rural medicine, capable of giving guidance and supervision to auxiliary personnel, and working through them'

**35 Bryant J H (1969) *Health and the Developing World*** Ithaca and London: Cornell University Press

Already mentioned under the health planning section, this book also contains valuable material on health manpower

#### **36 De Craemer B W and Fox R C (1968)**

##### *The Emerging Physician: A Sociological Approach to the Development of the Congolese Medical Profession*

Stanford: Hoover Institution on War, Revolution and Peace

An account of the transformation of the Congolese medical assistant into the Congolese doctor, and the subsequent demise of the medical assistant as a profession. An excellent account written by two sociologists

#### **37 Development of Modern Medical Education in India, and Student Wastage in Medical Colleges (1967)**

New Delhi: Institute of Applied Manpower Research

Statistically comprehensive study of the growth of Indian medical schools. By 1965 the number of admissions to the 90 or so Indian medical colleges had reached almost 11,000 annually

#### **38 Dutt P R (1962) *Rural Health Services in India, Primary Health Centres***

New Delhi: Central Health Education Bureau, Ministry of Health

A comprehensive account of rural health services in India. It argues that health centres provide the only realistic and economic approach to the health care needs of people in developing countries such as India

#### **39 Fein R (1967) *The Doctor Shortage – An Economic Diagnosis***

Washington, D C: The Brookings Institution

An economist's analysis of the shortage of medical manpower in the United States. Interesting for its methodology as well as for its conclusions

**40 First Conference of Caribbean Health Ministers (1969) *Final Report*** 2 vols  
Trinidad: Government Printery

The first of what is expected to be a regular series of conference reports. The document is of particular interest because of the special problems of 'mini-states'. The papers cover a wide range of topics including the manpower considerations of medical migration and the provision of specialist cover to small island populations

**41 Ginsberg E and Ostow M (1969) *Man, Money and Medicine*** New York and London: Columbia University Press

Professor Ginsberg questions some conventional solutions to the health care problems of the United States, particularly in the area of health manpower

**42 Gish O (1971) *Doctor Migration and World Health*** London: G Bell and Sons

The quantity and types of medical doctors available in developing countries are explained against the background of the international demand for medical graduates. The inappropriate values which developing country doctors often bring back from more industrialised areas are seen as being potentially more dangerous than the actual fact of non-return (the 'brain-drain'). (See also Bib No 7)

**43 Greenfield H I with the assistance of Brown C A (1969) *Allied Health Manpower: Trends and Prospects*** New York and London: Columbia University Press

Describes current trends in using people with less lengthy and sophisticated training to undertake some of the jobs done by doctors. Covers employment statistics, systems of education, and recommendations for future action to improve recruitment and training. Mostly relevant to the United States, this work refers more to paramedical personnel than to auxiliaries

**44 Hall T L (1969) *Health Manpower in Peru: A Case Study in Planning*** Baltimore, Md: Johns Hopkins

Very useful for understanding the health care systems of Latin America. It differs from the others in this Johns Hopkins series in that it presents the view of an individual rather than a team. (See also Bib Nos 33 and 55)

**45 Harris S E (1964) *The Economics of American Medicine*** New York: Macmillan

Already mentioned in Part 1, this also contains useful material on manpower

**46 Judek S (1964) *Medical Manpower in Canada*** Canada Royal Commission on Health Services, Ottawa: Queen's Printers

The most comprehensive study of the medical manpower situation in Canada

**47 King M H ed (1966) *Medical Care in Developing Countries*** Nairobi: Oxford University Press

Already mentioned in Part 1, this book is equally useful on the subject of health manpower

**48 Margulies H and Stephenson Bloch L (1969) *Foreign Medical Graduates in the United States*** Cambridge, Mass: Harvard University Press

The first study of any consequence of the foreign medical graduate in the United States. This volume reflects the increasing dependence of the United States on such practitioners, particularly those coming from developing countries

**49 Medical Manpower (1966)** London: Office of Health Economics

Useful basic statistics of medical manpower in Britain. This monograph sets out the background to Britain's present medical manpower shortage

**50 Pan-American Health Organisation (1964)** *Health Manpower and Medical Education in Latin America* **Milbank Memorial Fund Quarterly** Vol xiii, No 1, pp 11-66

This is the report of a conference to discuss an appropriate research approach to the problems of physicians' needs and of medical education. Discussions were based on the assumption that 'the future preparation of physicians should be designed to fit the framework of the plans and goals established for the solution of health problems in the context of the national plan for socio-economic development'. Details are worked out of the three topics that future studies should cover: measurement of health needs and demands and the establishment of health goals; the resources needed to attain these goals; and the modifications required in the patterns of medical education

**51 Pan-American Sub-Committee on Migration (1966)** *Migration of Health Personnel, Scientists and Engineers from Latin America* Washington DC: PAHO

Analysis of the volume and factors involved in the present flow of professional manpower, including physicians, from Latin America to the United States. Physician migration is seen as being a 'special case'

**52 Report Submitted by the Commission for Clarifying the Problem of the Shortage of Doctors, 1963-1964 (1964)** Jerusalem: Ministry of Health

A study which describes a shortage of doctors within certain geographical and professional areas in Israel, a country which enjoys the services of more doctors per head of population than any other in the world. The committee rejected proposals for increasing the output of medical graduates in favour of policies directed toward better utilisation of the existing stock of doctors

**53 Study on Health Manpower and Medical Education in Colombia (1967)**

3 vols. Washington DC: PAHO

Inspired by the conference mentioned in Bib No 50, this is probably the most comprehensive national health manpower study yet attempted. Those involved in the work included the Colombian Ministry of Public Health, the Colombian Association of Medical Schools and the World Health Organisation (PAHO). Emphasis was on the collection of data

**54 Takulia H S (1967)** *The Health Centre Doctor in India* Baltimore, Md: Johns Hopkins

A sociological survey leading to a better understanding of the uses of medical manpower in rural India. The doctor's view of his role in a rural health centre is described

**55 Taylor C E Dirican R and Deutsche K W (1968)** *Health Manpower Planning in Turkey: an International Research Case Study* Baltimore, Md: Johns Hopkins

This is a more sophisticated study than the one mentioned in Bib no 33, with results that appear to be more satisfactory and useful. Here, effective economic demand for the services of health manpower is not the only criterion used in calculating that demand (See Bib No 44)

**56 Wolstenholme GEW and O'Connor M eds (1967)** *Health of Mankind* (Ciba Fdn) London: Churchill

Previously discussed in Part 1. The material contained in this book is also relevant to the manpower question, particularly the paper by Dr A L Kaprio

**57 US Department of Health Education and Welfare (1967)** *Health Manpower Perspective: 1967* Washington DC: USGPO

**58 US Department of Labour (1967)** *Health Manpower 1966-75: A Study of Requirements and Supply* Report No 323 Washington DC: USGPO

**59 US Department of Health, Employment and Welfare (1968)** *Health Manpower in the United States 1965-1967* Series 14, No 1. Washington DC: USGPO

**60 US Department of Health, Education, and Welfare (1969)** *Health Manpower Source Book* Washington DC: USGPO

These four studies offer basic statistical material on health manpower and health manpower projections in the United States

**61 WHO Technical Report Series No 294 (1965)** *Integration of Mass Campaigns against Specific Diseases into General Health Services* Geneva: WHO

Contains the collective views of an international group of experts. There is an interesting chapter on the training of personnel to fit them for changing trends in health needs

**62 WHO World Health Statistics Annual 1966, Vol III, (1970)** Health Personnel and Hospital Establishments. Geneva: WHO

This publication has already been included in Part 1 but is equally relevant here

## ARTICLES

**63 Zile Hyde H van ed (1966)** Manpower for the World's Health *J med Educ* vol 41, no 9, part II

Report of the 1966 Institute of International Medical Education convened by the American Association of Medical Colleges. Although all the papers are of interest, those by McDermott and Ruderman are particularly useful

**64 Afridi M K (1968)** Priorities in Planning and Development of Health Manpower Resources and Programmes *J med Educ* vol 43, no 2, pp 190-196

Considers the development of the rural health worker as an essential, albeit problematical, element of any national health scheme, difficulties being the type of training and the relationship between medical auxiliary and medical graduate. Diploma qualifications for the former often produce two categories of doctors and a conflict of service interests

**65 Baker T D (1966)** Dynamics of Health Manpower Planning *Med Care* vol 4, no 4, pp 205-211

Health manpower planning from the 'effective economic demand' point of departure, the principle being that supply must be made to match effective economic demand but must not overshoot the mark

**66 Banerjee A K (1969)** The Problem of Medical Manpower in India *Wld med J* vol 16, no 2, pp 41-44

Despite a real shortage of health personnel, the author points out that 'as regards doctors the real problem is not one of numbers but of distribution and utilisation'. He sees the auxiliary health worker as the only solution to the problem

**67 Barton W L and Dowling M A C (1969)** Human Resources in Tropical Health Programmes: Some Aspects of Long-Term Planning and Staff Training *Trans R Soc trop Med Hyg* vol 63, no 2, pp 155-170

Interesting discussion of methodological problems in health manpower planning. An attempt to provide the health administrator with techniques for more realistic forecasting of human resources

**68 Bennet F J, Hall S A, Lutwama J S and Rado E R (1965)** Medical Manpower in East Africa: Prospects and Problems *E Afr med J* vol 42, no 4, pp 149-161

An analysis of the medical manpower situation in East Africa with projections for the next 15 years. The only solution to the foreseen shortage lies in expanding the medical school structure and retaining and expanding programmes for training medical auxiliaries

**69 Boateng C G (1969)** The Requirements for Medical Manpower as Viewed by the Medical Profession in a Developing Area *Wld med J* vol 16, no 6, pp 138-139

Describes the situation in Ghana with its limited pool of educated manpower and with health needs given a low priority by government. The Ghana Medical Association suggests ways of overcoming the deficiencies, including improvement in the social status of medical workers

**70 Candau M G (1967)** Health Manpower in Developing Countries *Can J publ Hlth* vol 58, no 8, pp 347-354

The perspective for health manpower development as seen by the Director-General of the World Health Organisation

**71 Cavanagh J A (1964)** Future Health Manpower Needs in Latin America *Publ Hlth Rep* vol 79, no 10, pp 911-916

The author, using mathematical techniques, attempts to relate the medical manpower requirements of an increasing Latin American population to medical manpower supply. He concludes that in 1970 almost 200,000 physicians were required (compared with 114,000 in 1960) and more than 175,000 nurses (37,000 in 1960)

**72 Collis WRF, Nicholson T F and Audu IS (1966)** Manpower Needs and Medical Education in Nigeria *Br med J* vol 1, 26 March, pp 792-794

The discussion touches upon many of the more important questions relevant to medical manpower development in African countries, as seen from within the Nigerian context. The authors do not see the need for the use of medical auxiliaries in Nigeria

**73 Crane P S (1969)** An Unresolved Problem for Developing Countries *J Am med Ass* vol 209, no 13, pp 2039-2041

The transformation of medicine in South Korea has led to unexpected results. Dr Crane finds that 'by training Korean physicians along international standards we had opened the door for them to escape the bindings of a developing nation'

**74 Davies R E (1969)** The Problem of Medical Manpower in Rural Australia *Wld med J* vol 16, no 1, pp 9-10

The problems of rural medical care in an industrialised country can, in certain ways, be similar to those of Asia or Africa. Given the geography of a country such as Australia, this is especially the case

**75 Fendall N R E (1965)** Medical Planning and Training of Personnel in Kenya *J trop Med Hyg* vol 68, no 1, pp 12-20

This article includes ideas about the use and training of both medical and other auxiliaries and the integration of a gradually improving general educational level into their career and training structure

**76 Fendall N R E (1967)** A History of the Yaba School of Medicine, Nigeria *W Afr med J* vol 16, no 4, pp 118-124

The Yaba school of medicine made a most important contribution to the development of medical care in Nigeria. In response to the rising educational level of potential recruits, its history shows the satisfactory continual upgrading of the type of education being offered

**77 Gerber A (1969)** The Medical Manpower Shortage, a Worldwide Problem *Wld med J* vol 16, no 1, pp 4-6

The American medical manpower shortage is placed in a world-wide context and discussed in relation to the medical 'brain drain' and the use of medical auxiliaries. Although the scope for physician assistants in the United States is doubted, an important place is seen for them in developing countries

**78 Gish O (1969)** Emigration and the Supply and Demand for Medical Manpower: the Irish Case *Minerva* vol 8, no 4, pp 668-679

The relationship between supply and demand and medical emigration in one country which has long been an exporter of medical manpower. The implications for developing countries are discussed

**79 Gish O and Wilson J (1969)** Emigrating British Physicians *Social Science and Medicine* vol 3, no 3, pp 495-511

An analysis, in some depth, of the migration situation in a country which lost some 7000 medical graduates through emigration between the early 1950s and the late 1960s. The relationship between British medical migration and the inflow into the UK of doctors from the developing countries is also discussed

**80 Gwee A L (1969)** The Assessment of Medical Manpower Needs *Wld med J* vol 16, no 1, pp 8-9

A physician from Singapore points out some of the social and economic considerations which enter into medical manpower demand projections. As might be supposed, much more is involved than simple doctor-to-population ratios

**81 Hansen W L (1964)** Shortages and Investment in Health Manpower *Health Manpower in the Economics of Health and Medical Care* ed Mushkin S J. Ann Arbor, Michigan: University of Michigan

This whole volume is useful. Hansen's contribution concentrates most particularly on the 'rate of return' approach to manpower. The relevance of this approach in the imperfect conditions of developing countries has, however, been questioned

**82 Hiestand D L (1966)** Research into Manpower for Health Services *Milbank Memorial Fund Quarterly* vol xlv, no 4, part 2 pp 146-176

This is an appraisal of recent research into manpower for the health sciences, indicating the accomplishments and also suggesting some of the main lines to be pursued in the future

**83 King M (1971)** The New Priorities in Tropical Medicine in *Teamwork for World Health* (Ciba Fdn) eds Wolstenholme G and O'Connor M. Edinburgh and London: Churchill Livingstone

A paper contributed to an international conference of health experts and much influenced, in the author's own words, by his experience in Malawi in 1969 of advising on a new health plan. King concentrates on the need for both quality and quantity in the medical auxiliary field and recommends much greater use of modern audio-visual methods for health education

**84 Kissick W L (1968)** Health Manpower in Transition *Milbank Memorial Fund Quarterly* vol xlv, no 1, pp 53-87

This paper attempts 'to suggest issues and to provoke a discussion of health manpower policy' on the grounds that increased expenditure will make little impact on health services without better preparation and use of manpower. After an assessment of resources and the various factors influencing the full realisation of manpower potential, Kissick discusses the essential components of a manpower policy. All of these — education, 'theory-skill spectrum', core curricula, career mobility, downward transfer of functions and the application of technology — are as relevant to developing countries as they are to the United States

**85 Klarman H E (1969)** Economic Aspects of Projecting Requirements for Health Manpower *J Human Resources* vol 4, no 3, pp 360-376

An important article which demonstrates varying approaches to health manpower planning. It suggests that the economist doubt the fixity of any ratios among the categories of health personnel described, and also of health personnel to populations

**86 Lee W C (1970)** Medical Education and Medical Practice in Korea *J med Educ* vol 45, no 5, pp 283-292

Undergraduate medical education in Korea has been closely modelled on the American system, producing a doctor/patient ratio of 1:1000 in Seoul and 1:10 000 in the rural areas. The author constantly stresses the need to change attitudes towards medical education and adjust it to prevailing socio-economic conditions, while at the same time emphasising equally forcibly that the present high standards of education and training must be maintained

**87 McReary J F (1970)** Summary of the National Health Manpower Conference *Can J Publ Hlth* vol 61, no 1, pp 43-46

An interesting review of this conference, sponsored by the Department of National Health and Welfare and the Association of Universities and Colleges of Canada and held in Ottawa in October 1969

**88 Navarro V (1969)** Planning for the Distribution of Personal Health Services *Publ Hlth Rep* vol 84, no 7, pp 573-581

A review of the methods used in planning the distribution and use of health resources, including those based on morbidity, mortality, distribution, system performance and system structure

**89 Orleans L A (1969)** Medical Education and Manpower in Communist China *Comparative Education Review* Feb 1969 pp 20-42

An important study which attempts to quantify the many varieties of health manpower currently being employed in China. Although the statistical and analytical problems are substantial, the author does manage a coherent picture

**90 Peacock A and Shannon R (1968)** The New Doctor's Dilemma *Lloyds Bank Review* Jan pp 26-38

Problems of medical manpower planning in the United Kingdom. The authors argue against the manpower planning approach as such and in favour of allowing the market mechanism to play a larger role in determining demand

**91 Rao K N (1970)** Medical Education in Medical Manpower *Indian J med Educ* vol ix, no 1, pp 11-15

A general discussion of the development of the health manpower situation as it exists in India

**92 Rifka G E and Churchill C W (1969)** Loss of Medical Manpower in a Developing Country *J med Educ* vol 44, no 12, pp 1144-1149

A discussion of the factors making for medical emigration from the Middle East. It was found that 20 percent of the 1954-64 graduates of the two Lebanese medical schools were resident abroad in 1968

**93 Rosa F (1964)** A Doctor for Newly Developing Countries: Principles for Adapting Medical Education and Services to Meet Problems *J Med Educ* vol 39, no 10 pp 918-924

This account, by the former medical director of the Gondar Public Health College and Training Centre, Ethiopia, presents certain basic principles for the most effective use of health skills where health problems are quite different from those in developed countries and resources are limited. Health programmes must be designed within the context of local problems and he discusses problems of implementation, stressing that the important question is not so much what the level should be for professionals in developing areas as how each level of trainee can be developed effectively

**94 Rosch G (1969)** The Present and Future Medical Manpower Situation in France, Europe and the USA *Wld med J* vol 16, no 6, pp 135-137

Estimated medical manpower needs for the industrialised countries of Europe and the United States

**95 Sandosham A A (1969)** Medical Manpower in a Rapidly Expanding Population *Wld med J* vol 16, no 1, pp 11-12

Population is growing in Malaysia at about three percent a year and there is at present only one very new medical school. The use of 'sub-standard medical personnel' as a means of meeting the country's health needs has been rejected

**96 Saroukhanian G (1968)** Needs of the Middle East for Health Manpower *Acta Medica Iranica* (Quarterly Journal of University of Teheran Faculty of Medicine) vol xi, no 3/4, pp 67-83

Analysis of the requirements and supply of medical manpower in the Middle East.

**97 Taba A H (1969)** A View of the World Health Organisation — Eastern Mediterranean Region *J med Educ* vol 44, no 4, pp 278-284

The author, director of the WHO Eastern Mediterranean Region, sees health assistants as a temporary solution in the face of an acute manpower problem but reacts strongly against the idea of 'hasty half-trained medics' and the 'dilution' of medical education

**98 Wheeler M (1969)** Medical Manpower in Kenya: A Projection with Some of its Implications *E Afr med J* vol 46, no 2, pp 93-101

This is a continuation of the discussion initiated in the article on the same subject by Bennett et al (see Bib No 67). By the use of detailed statistics Wheeler shows that the scarcity of doctors will not be alleviated as originally hoped

**99 Wilbur D L and Margulies H (1969)** The Requirements for Medical Manpower *Wld med J* vol 16, no 6, pp 140-143

Shows that the USA is facing the same problem as other countries in the provision of adequate medical care in rural areas and among the less privileged; remedies suggested include better teamwork and a redistribution of responsibilities

**100** World Shortage of Medical Manpower (1965) *WHO Chronicle* vol 19, no 2, pp 47-55

A review of the efforts made within the six regions of the World Health Organisation to improve the supply of physicians and other categories of health worker

### III

## Medical auxiliaries

#### BOOKS AND REPORTS, ETC

**101 Bryant J H and Arnstein G (1965)** *Report to Thailand on Health Services, Health Personnel and Medical Education* New York: Rockefeller Foundation

Previously mentioned in Parts 1 and II, the report also suggests various alternatives for providing simple medical care through auxiliary personnel trained to meet specific job requirements. Auxiliaries, it is argued, are the only way of meeting quantitative needs within the limits of Thailand's economy and educational resources.

**102 Bryant J H (1969)** *Health and the Developing World* Ithaca and London: Cornell University Press

See Bib No 4, but also useful for its discussion of medical auxiliaries

**103 De Craemer B W and Fox R C (1968)** *The Emerging Physician* Stanford: The Hoover Institution on War, Revolution and Peace

This volume has already been described in Part II. Its content is equally relevant to the question of auxiliaries

**104 Horn J S (1969)** *Away with All Pests* London: Hamlyn

Already mentioned in Part 1, this book also contains much useful material on auxiliaries

**105 King M H ed (1966)** *Medical Care in Developing Countries* Nairobi: Oxford University Press

Previously mentioned in Part 1, this book also contains much useful material on auxiliaries.

**106 Rosinski E F and Spencer F J (1965)** *The Assistant Medical Officer* Chapel Hill: University of North Carolina Press

The training of the medical auxiliary in Fiji, Papua, Kenya, Ethiopia and Tanganyika (now Tanzania). This is a descriptive survey of the selection, training and employment of 'doctor substitutes' in response to differing needs and is one of the basic books on the subject

**107 US Department of Health Education and Welfare, Public Health Service (1966)** *Health Auxiliary Training: Instructor's Guide* Washington DC: USGPO

Describes the training programme worked out as a result of the experience of preparing Indian and Alaskan health workers to serve as effective liaison between their own people and the non-native professionals. The health auxiliaries learn to undertake many semi-professional and less complex tasks in the provision of care

**108 US Department of Health, Education and Welfare, Public Health Service (1968)** *Training the Auxiliary Health Worker* Washington DC: USGPO

This booklet describes programmes of training for auxiliary health workers and covers functions, training content, costs and facilities

**109 WHO Technical Report Series No 385 (1968)** *Seventh Report of the WHO Expert Committee on Professional and Technical Education of Medical and Auxiliary Personnel: Training of Medical Assistants and Similar Personnel* Geneva: WHO

Sets out guidelines for the selection and training of medical auxiliaries with the educational level of available candidates. Continual review of training programmes and in-service training together with a satisfactory career structure are recommended

**110 WHO International Digest of Health Legislation (1968)** *Medical, Dental and Pharmaceutical Auxiliaries* vol 19, no 1, pp 3-143: Geneva: WHO

Although not complete, this survey of existing national legislation covering auxiliary personnel is the most extensive document to date

**111 WHO Regional Office for the Western Pacific and South Pacific Commission (1961-62)** Report on the Refresher Course on Integrated Rural Health for Assistant Medical Officers in the South Pacific *WHO Regional Office for the Western Pacific Pamphlets on Rural Health* vol 1 Manila: WHO

Assistant medical officers are stationed mainly in rural areas where they are responsible for all curative work as well as a certain amount of preventive work. The course was designed to bring them up to date with developments in the medical field and covered public health, preventive medicine, promotive health and environmental sanitation. Appendices to the report give useful summaries of the lectures

**112 WHO Regional Office for the Western Pacific (1963)** Report of the First Regional Seminar on Rural Health Services *WHO Regional Office for the Western Pacific Pamphlets on Rural Health* vol 1 Manila: WHO

This was a meeting to review concepts and practices and to exchange views on the rural health services in participating countries. The participants also explored available resources which might assist in rural health development and in the identification of areas for cooperation

**113 WHO Regional Office for the Western Pacific (1966)** *Report of the First Regional Seminar on Education and Training: Training of Auxiliary Health Personnel* Manila: WHO

The seminar covered the many factors involved in the training of auxiliary health personnel including the objectives, types of training and planning as well as the need for such personnel, their function and scope

## ARTICLES

**114 Baker T D (1971)** Paramedical Paradoxes — Challenges and Opportunity *Teamwork for World Health* (Ciba Fdn) eds Wolstenholme G and O'Connor M. Edinburgh and London: Churchill Livingstone

Outlines the need for middle level professionals, especially in poorer countries, and suggests priorities for the establishment of a cadre of medical auxiliaries

**115 Browne S G (1964)** The Role of the Medical Auxiliary in Field Surveys, in *Tropical Agriculture Trans R Soc trop Med Hyg* vol 58, no 5 pp 370-376

The valuable contribution made by teams of medical auxiliaries in the course of mass surveys in tropical Africa is illustrated by examples drawn from a circumscribed control area in the former Belgian Congo.

**116 Biddulph J (1969)** Medical Assistants *Papua New Guin med J* vol 12, no 1, pp 23-25

A straightforward account of the role and need for medical assistants in countries such as Papua and New Guinea

**117 Burkitt W R (1969)** Rural Mobile Medicine *Kenya E Afr med J* vol 46, no 10, pp 541-547

Describes the way in which a centrally based specialist can actively supervise the work of medical auxiliaries especially trained for ophthalmic work in rural areas

**118 Chang W P (1970)** Health Manpower Development in an African Country: The Case of Ethiopia *J med Educ* vol 45, no 1, pp 29-39

This is a good description of the successful health manpower programme in Ethiopia. Of particular interest is the 'health officer' in charge of a rural health centre staffed by a nurse and sanitarian — the emphasis on preventive medicine with a team approach. In Ethiopia there are 24 million people but fewer than 400 doctors, of whom 75 percent are expatriates. Some of the problems of the existing programme, arising from the development of the first medical school in the country, are discussed

**119 Cunningham N (1969)** An Evaluation of an Auxiliary-Based Child Health Service in Rural Nigeria *J Soc Hlth Nigeria* vol 3, no 3, pp 21-25

Excellent field study of an auxiliary-based system which appears to be producing significantly improved child health at reasonably low cost in a rural area where more highly trained individuals are, and for some time will probably remain, available only on a short term or supervisory basis

**120 Dadgar M and Saroukhanian G (1971)** The Health Corps in Iran: An Approach to the Better Distribution of Health Resources in Remote Areas *Teamwork for World Health* (Ciba Fdn) eds Wolstenholme G and O'Connor M. Edinburgh and London: Churchill Livingstone

Dr Dadgar founded and continues to direct the Iran Health Corps. This paper is an interesting account of the health situation in Iran and the organisation and impact of a novel approach to the provision of better medical care in rural areas. The success of the scheme can be judged from the statistics

**121 Estes E H (1968)** Advantages and Limitations of Medical Assistants *J Am Geriat Soc* vol 16, no 10 pp 1083-7

An outline is given of the experiment at Duke University in training young men for the manpower category of Physician Assistant. The selection of candidates, the two-year training course and the post-certificate duties are described. Despite the stated problems and dangers, the results to date have been encouraging

**122 Estes E H and Howard D R (1970)** Potential for Newer Classes of Personnel: Experience of the Duke Physician's Assistant Programme *J med Educ* vol 45, no 3, pp 149-155

The authors argue the case for different kinds of assistant to physicians as an integral part of future health systems. Presenting a description of the programme, they show how physicians and public gradually accepted the idea, but point out that a plan of public and professional education within the community is essential to ensure progress

**123 Fendall N R E (1964)** Organisation of Health Services in Emerging Countries *The Lancet* vol 2, July, pp 53-56

This is a general survey of the necessary approach to and structures of health services with planning conceived in a climate of 'balanced realism' - with 'a division of resources between the needs of the few for more advanced and expensive forms of therapy and the needs of the many for simple medical aid'. Auxiliary workers based on rural health centres form the basis of such a system

**124 Fendall N R E (1963)** Planning Health Services in Developing Countries — Kenya's Experience *Publ Hlth Rep* vol 78, no 11, pp 977-988

Stresses the essential factors for health service planning in developing countries. These include the value of the rural health centre concept

**125 Fendall N R E (1965)** Medical Planning and Training of Personnel in Kenya *J trop Med Hyg* vol 68, no 4, pp 12-20

Shortages of personnel and teachers dictate concentration on as few categories of workers as possible together with a minimum of courses strictly essential to the basic services, namely a two-tier structure of professional and para-medical on the one hand, auxiliaries on the other

**126 Fendall N R E (1968)** The Medical Assistant in Africa *J trop Med Hyg* vol 71, no 4, pp 83-95

Surveys the role of medical auxiliaries in different settings and stresses their function as complements to rather than substitutes for physicians

**127 Geigy R (1965)** Rural Medical Training at Ifakara: Swiss Help to Tanzania *The Lancet* vol 1, Jan 16, pp 1385-1387

Describes the development, with the aid of foreign assistance, of a rural centre as a place of training for different levels of medical auxiliary

**128 Gerber A (1969)** The Medical Man-power Shortage, a World Wide Problem *Wld med J* vol 16, no 1, pp 2-6

See original inclusion as Bib No 76. Useful for its discussion of medical auxiliaries as well as doctor utilisation

**129 King M H (1971)** The Auxiliary — His Role and Training *J trop Med Hyg* Vol 73, no 12, pp 336-346

A very valuable and comprehensive article by one of the world's leading authorities on the principle of training and using health care auxiliaries in developing countries. Prof King writes from first hand experience of the pressing need to produce and extend such a cadre, given accurate health statistics and realistic manpower targets based on projected population growth. The present output of auxiliaries must be greatly increased even to maintain the *status quo*. Prof King suggests many ways of improving both the theory and practice of teamwork in health care and for putting the training of auxiliaries on a sound professional basis. He recommends the use of selection techniques and streamlined modern curricula geared to local needs. The auxiliary then will be a highly skilled professional at a clearly defined level.

In-service training is emphasised as particularly important and sometimes as a way of replacing more costly extension of a health service. The development of Institutes of Medical Education is suggested as a means of integrating auxiliary and professional training, but this point of Prof King's leads to the single criticism that might be made of an otherwise outstanding article. His use of the term 'professionals' appears to mean doctors as opposed to auxiliaries. It would be a great pity if this terminology unintentionally reinforced the common misconception that medical auxiliaries are 'second-rate' doctors. There is a growing and world-wide acceptance of the idea that medical auxiliaries are altogether a different type of medical personnel and that they are very much professionals in their own right

**130 Korn J (1970)** Kibaha Training Health Centre, A Nordic Non-Luxury Project *Wld med J* vol 17, no 1, pp 17-18

This article includes a brief description of the Tanzanian Kibaha Centre's functions and its training programme for various categories of health staff including 'rural medical aides', described as the most important element in the health services of Tanzania at present

**131 Roubakine A N (1969)** Feldshers in the Soviet Union *Wld med J* vol 16, no 1, pp 6-8

Detailed description of the training and utilisation of feldshers in the Soviet Union. It is stated that there is no question of getting rid of feldshers or abolishing the title; in the judgment of the author 'the value of this grade has been well proven'

**132 Taylor C E (1962)** Orientating Doctors to Village Service *Indian J med educ* vol i, no 4, pp 307-315

Maintains that the only way to achieve an economic rural medical service is to make the maximum use of auxiliary skills through the intensive development of several categories of auxiliary workers to relieve the doctor's burden of routine work. Taylor would have a short and practical, but high, standard of preparation with emphasis on preventive medicine. The auxiliary should work under the supervision of a doctor

**133 Waddy B B (1963)** Rural Health Services in the Tropics and the Training of Medical Auxiliaries for Them *Trans R Soc trop Med Hyg* vol 57, no 5, pp 384-391

Based on extensive experience in West Africa. Dr Waddy indicates the type of manpower necessary for the development of proper rural health services in low-income countries

**134 Weston Smith J and Mottram E M (1967)** Extended Use of Nursing Services in General Practice *Br med J* 16 Dec no 4, pp 672-694

Describes a successful experiment in which a State Registered Nurse was attached to a general practice of 5000 people to assist with clinical duties. An analysis of the results, both from medical records and from a questionnaire survey, showed that there was a definite place for this service. Most patients welcomed the scheme, as demonstrated by the fact that after more than 700 visits by the nurse there were only three subsequent requests for the doctor, these merely for reassurance





## INTERMEDIATE TECHNOLOGY DEVELOPMENT GROUP

9 KING STREET, LONDON WC2E 8HN. A SHORT INTRODUCTION TO THE GROUP AND ITS AIMS. ALSO IN THIS LEAFLET: A MEMBERSHIP APPLICATION FORM, A FORM OF COVENANT, A BANKER'S ORDER FORM AND A HANDY PUBLICATIONS LIST AND ORDER FORM

The Intermediate Technology Development Group was formed in 1965 by a group of engineers, scientists, economists and others from industry and the professions. It is a non-profit research and development organisation created to provide practical and effective self-help techniques for developing countries.

**TECHNOLOGY FOR DEVELOPMENT** The group starts from the conviction that development begins with people. The nature and quality of aid must be designed to help the poor to help themselves, which means providing them with knowledge, tools and equipment.

The group's aim is thus not merely to supplement the existing aid programme. It is to change the direction and emphasis by demonstrating that up-to-date science and technology can provide low-cost, simple techniques which make it possible for very large numbers of people to work their way out of poverty. The group believes that this is the only effective way of meeting the challenge of massive and growing unemployment in the developing countries of the world.

The highly sophisticated, capital-intensive, labour-saving methods and equipment currently being exported as aid by the rich countries do not help the mass of people in poor countries to help themselves. They promote the kind of development that:

Largely by-passes the majority, the rural and small-town dwellers

Concentrates industrial development in a small number of cities while unemployment and underemployment are rife

Creates very few new jobs and often wastes scarce capital resources, because many of the elaborate facilities required to support capital-intensive industry are absent — the mass markets, the special raw materials, the special skills

Requires extensive imports of plant and machinery, which strain a poor country's balance of payments; prolonging or even increasing its dependence on rich countries.

Technologies intelligently adapted to the actual conditions of people in developing countries, on the other hand, can and should be:

Cheap enough to be distributed in quantity, thus helping to create *widespread* activity  
Simple enough to be used and maintained by men and women without costly and sophisticated skills

Designed to maximise use of local labour and local raw materials and to minimise dependence on imports, and thereby on scarce foreign exchange.

Such technologies are truly intermediate — more productive than the methods now in use, but far cheaper and less complex than the mass-production, labour-saving methods employed by highly industrialised countries. They are, in short, techniques that raise productivity without saving labour. They are techniques which poor communities can afford, and which they can operate and maintain for themselves.

### BRIDGING THE INFORMATION GAP

A great deal of information exists about modern labour-saving technologies. Much current research seems aimed at eliminating the human factor from the productive process altogether. In contrast, information about relatively simple technologies is not readily available to those who need it. Neither is any significant research effort going into the development of techniques for self-help that could be within the reach of rural populations.

Yet people must be helped to help themselves.

*Rural populations in particular will continue to be by-passed by development unless appropriate self-help technologies are made known to them and demonstrated to them in action.*

### THE GROUP'S OBJECTIVES

Accordingly, the group has set itself these three main tasks

Systematically assembling and documenting data on efficient labour-intensive techniques suitable for small-scale production, and where necessary promoting new research and development work

Publicising this information and making known the concept and practical value of intermediate technology through books, articles and public discussion

Assisting specific projects in developing countries to demonstrate how poor people in poor communities can help themselves.

### HOW ITDG WORKS

The group's work programme is carried out with the voluntary assistance of panels of specialists, all of whom have wide overseas experience.

So far, 10 panels and research teams have been formed. They are

BUILDING FOR DEVELOPMENT  
WATER DEVELOPMENT  
FOOD TECHNOLOGY  
AGRICULTURAL TOOLS AND EQUIPMENT  
SMALL INDUSTRY DEVELOPMENT  
COOPERATIVE DEVELOPMENT  
RURAL HEALTH  
POWER NEEDS AND RESOURCES  
EDUCATION AND TRAINING  
UNIVERSITIES LIAISON

Of these, the first five — on building, water, food technology, agricultural tools and equipment, and small industry — operate field projects with research grants made available by the Overseas Development Administration and by charitable foundations. Others are engaged in documentation, and in the preparation of research and development projects. Work on training is carried out in collaboration with STRIVE (Society for Training in Rural Industry and Village Enterprise).

ITDG is a company limited by guarantee and registered as a charity. Apart from research grants devoted to specific projects, the group is financed from charitable sources, including the subscriptions of individual and corporate bodies.

### ASSOCIATION WITH THE GROUP

Association with the group is open to all who are concerned with development problems and are willing to support its policy of engendering self-reliance by creating productive employment in developing countries.

An annual subscription of £1.00 for individual members and £5.00 for firms and other organisations entitles associates to receive the ITDG Bulletin, published three times a year, and the annual report. These provide a detailed account of how the group is mobilising the resources of the professions, industry, and the universities in its work.

## APPLICATION FOR ASSOCIATE MEMBERSHIP OF ITDG

Individual membership	£1.00 pa
Companies and organisations	£5.00 pa

NOTE The research and development work of ITDG is always in need of funds. Donations in addition to the fixed subscription are always very welcome

I/We wish to become an individual/corporate associate member of ITDG and enclose my/our annual subscription of £ . . . . . for one year from the date of receipt of this form by ITDG.

I/We also enclose £ . . . . . as a donation

NAME (Mr Mrs Miss) \_\_\_\_\_

ADDRESS \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

### PUBLICATIONS ORDER FORM

The following are the ITDG publications currently available. As these are printed in limited numbers we cannot always guarantee that all orders will be filled. Copies sent to countries outside the UK will be sent by seamount unless otherwise instructed

*Tools for Progress* ... .. 75p ☐

*Bibliography on Low-Cost Water Technologies* ... .. £1.00 ☐

*Rome Conference Report* ... .. 37½p ☐

*Health Manpower and the Medical Auxiliary* ... .. £1.50 ☐

*Oxford Conference Report* ... .. 15p ☐

*ITDG Bulletins* ... .. 20p ☐

*The Introduction of Rainwater Catchment Tanks and Micro-Irrigation to Botswana* ... .. 75p ☐

*Information kit on ITDG* ... .. 50p ☐

Under preparation: directories of hand-operated and animal-drawn farm equipment, and of UK manufacturers of small-scale equipment; Building for Development research reports and teaching material; industrial profiles

NAME \_\_\_\_\_

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Special Instructions \_\_\_\_\_

Payment to be made upon receipt of invoice from ITDG

Return to: Publications Department, ITDG, 9 King Street, London WC2E 8HN

**BANKER'S ORDER AND FORM OF COVENANT** If you enter into a Deed of Covenant for seven years, your subscription is greatly increased in value to us as we are able to reclaim income tax. If you complete the Banker's Order, your subscription will be paid annually, without the bother of a reminder

**FORM OF COVENANT**

THIS DEED OF COVENANT is made the \*\*..... day of ..... 19.....

BETWEEN .....  
(hereinafter called the Subscriber) of the one part and Intermediate Technology Development Group Ltd of 9 King Street Covent Garden in the City of Westminster (hereinafter called the Group) of the other part;

WHEREAS the Subscriber is desirous of supporting the work of the Group by entering into the Covenant hereinafter contained;

NOW THIS DEED WITNESSETH as follows:

The Subscriber hereby covenants with the Group that during the term of seven years from the \*..... day of ..... 19..... the Subscriber will pay to the fund of the Group annually out of taxed income such a sum as will after deduction of income tax at the standard rate for the time being in force leave a sum of ..... pounds, the first annual payment to be made and subsequent annual payments on the ..... day of ..... in each subsequent year † (provided that this covenant shall determine upon the death of the Subscriber)

IN WITNESS

whereof the parties have set their hands and seals the day and year first above written.

SIGNED, SEALED AND DELIVERED

by the above named .....

in the presence of .....

Address of Witness .....

Occupation .....

The date at \* must be later than the date at \*\* † Delete and initial if the Subscriber is a limited company

**BANKER'S ORDER**

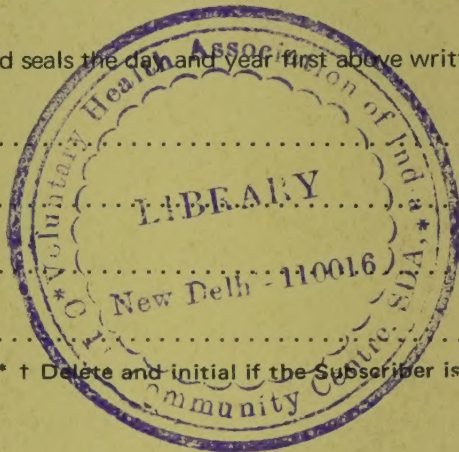
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Please pay to the account of Intermediate Technology Development Group Ltd at Barclays Bank Ltd, 5 Henrietta Street, London WC2, the sum of ..... and continue to make a similar payment on ..... in each year until further notice

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AND THE MEDICAL AUXILIARY

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